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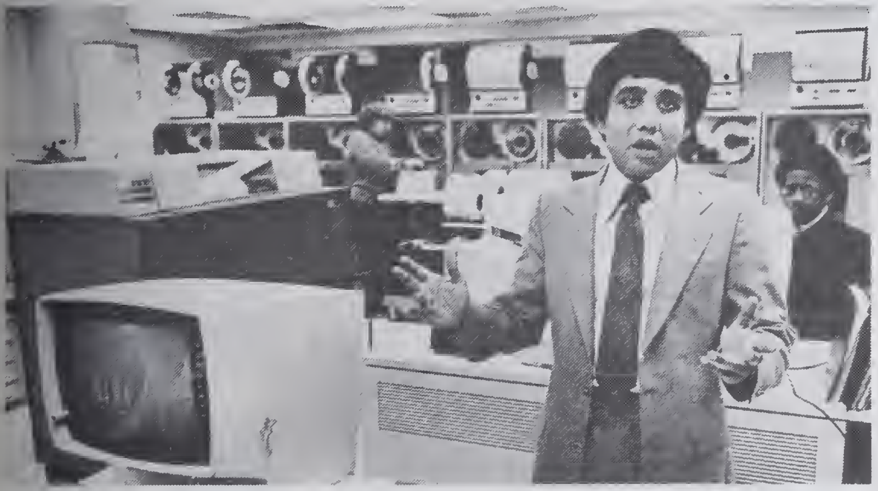
NEWSPAPER


N.Y Times Photo

Samit Roy, Atlanta's DP director, stands perplexed amid his team of computers engaged in helping to solve the 19 child slayings.

CPUs Join Hunt for Slayer Of 19 Children in Atlanta

By Bill Laberis
CW Staff

ATLANTA — Every minute scrap of information, each clue gathered by a dogged investigative army involved in the nation's biggest-ever manhunt is now being fed to dual mainframes at City Hall here.

And from remote terminals in their prowl cars, investigators can immediately access the computers for help in unraveling the bizarre events surrounding the brutal slayings of 19 black children, killings which have Atlanta's police baffled and its citizenry terrorized.

To date, more than 25,000 threads of information ferreted out by police, Federal Bureau of Investigation (FBI) agents, psychics, bloodhounds and posses have been digested by the twin IBM 3031s.

Samit Roy, Atlanta's DP director, said the murder investigation and an attempt to uncover a solution has been

(Continued on Page 6)

A New Kind of 'Iron'

DP the Latest Weapon In the Mob's Arsenal?

By Bill Laberis
CW Staff

Is organized crime marching into the 21st century with a growing army of mainframes, high-speed printers and disk drives?

A *Computerworld* investigation of mounting evidence gathered from public records, court cases and interviews with crime fighters around the country appears to indicate that computers are, in fact, being used to assist organized crime in some of its biggest illicit endeavors.

A similar CW investigative series 10 years ago came to the same conclusion: Organized crime was probably plunging headlong into computerizing some of its daily operations, at the same time dabbling in computer fraud.

The Federal Bureau of Investigation (FBI) and other federal investigators largely disagree with CW's findings. They say that organized crime, also known as the Mafia, the Mob and the Syndicate, has not computerized its operations to any perceptible degree.

Federal officials do acknowledge that organized crime historically has been able to adapt to change, taking fullest

(Continued on Page 8)

PE Expands Supermini Line With 32-Bit Rival to VAX

By Tim Scannell
CW Staff

OCEANPORT, N.J. — Perkin-Elmer Corp. (PE) last week introduced a midrange 32-bit minicomputer geared to round out its 3200 series computer line and aimed directly at Digital Equipment Corp.'s VAX-11/780 machine.

At the same time, the company also unveiled a user-initiated remote diagnostics capability for the new system that is optionally available for the two other computers in the 3200 series family.

PE's 3230 supports up to 8M bytes of main memory and reportedly has 94% of the power of DEC's VAX-11/780 at about 30% less cost. In fact, the 3230 — which is geared for scientific and high-performance commercial transaction processing applications — is comparable in price to DEC's pint-sized VAX, the 11/750.

(Continued on Page 4)

I/O Adapter Gets Burroughs Into NBS Fold

By Jake Kirchner
CW Washington Bureau

WASHINGTON, D.C. — Continuing its push for widespread federal acceptance of recently adopted I/O interface standards, the National Bureau of Standards (NBS) will soon take delivery of an interface adapter to bring Burroughs Corp. mainframes into conformance with the standards' specifications.

The adapter, scheduled for March delivery by Dynamic Sciences, Inc., Van Nuys, Calif., will — without software modification to Burroughs medium and large-scale mainframes — allow NBS to use disk and tape subsystems conforming to the four I/O standards, which were derived from IBM 360 or 370 architecture, according to Thomas Pyke Jr. of the NBS Institute for Computer Sciences and Technology (ICST).

Pyke, director of the ICST Center for Computer Systems Engineering, said the Dynamic Sciences contract is part of the NBS program to demonstrate the standards will indeed help agencies avoid being locked into a single vendor for mainframes and peripherals.

While the standards are mandatory for all new federal systems buys, NBS is hoping to stimulate their use to augment existing government systems, he explained.

A demonstration of the ability to integrate IBM-type peripherals with currently noncompatible mainframes of at least one other vendor is also in the works, Pyke said. In addition, work is

(Continued on Page 14)

Six CW Staffers Honored for 'Extra!'

NEW YORK — Six *Computerworld* staffers were honored here last week by the American Business Press (ABP) for their work on *Computerworld Extra!*

The six received a Jesse H. Neal certificate of merit for the best special issue of 1980. The Neal awards are often called the Pulitzer Prizes of the business publishing industry.

E. Drake Lundell Jr., editor, John Whitmarsh, managing editor, and Cheryl Gelb, news editor, were honored along with design consultant Garrow Throop, Tom Monahan, art director, and Nancy French, former managing editor.

CW Extra! was published Sept. 17, 1980 and was sent to all regular *Computerworld* subscribers. Featuring a four-color cover and including contributed articles from leading authors and experts, the issue focused its entire editorial content on a single subject: "The Dawn of the Software Decade."

CW Photo by A. Dooley

John Whitmarsh (left) and E. Drake Lundell Jr.

A total of 54 editors, writers and art directors on 16 business and professional publications received certificates of merit. An additional 56 editors on 14 business magazines and professional journals received Jesse Neal editorial achievement awards for "editorial excellence in the business press."

The Neal Awards were established 27 years ago by ABP to recognize and reward outstanding editorial achievements in audited, independent business publications.

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Extra!

Subscribers to Computerworld *should check their mailboxes this week and next for the second edition of* Computerworld Extra!

"Data Communications: The Changing Landscape" is the theme of our second Extra! *issue.*

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Averts Airliner Crash

System Saves World Trade Center

By Bob Johnson
CW New York Bureau

NEW YORK — An alert air traffic controller aided by a computerized warning system diverted an Argentine Boeing 707 jetliner from a collision course with the north tower of the World Trade Center here last weekend.

Aerlineas Argentinas Flight 342 was on its final approach to Kennedy Airport at 10:05 p.m. when air traffic controller Donald Zimmerman noticed the aircraft was flying 1,200 feet below its assigned altitude and was only 90 seconds away from the World Trade Center at the tip of Manhattan.

The Federal Aviation Administration (FAA), which is seeking statements from the plane's crew about the incident, gave credit to its Minimum Safe Altitude Warning System (Msaw) for alerting Zimmerman to the plane's disastrous course through an audible and visual alarm on his radarscope.

LOW ALT, a signal for low altitude, flashed continuously on Zimmerman's radarscope. The signal had been dispatched from the system's Sperry Univac Automatic Radar Terminal subsystem (Arts 3A) mainframe in the Garden City, N.Y., terminal radar control center (Tracon). Realizing that the jet was on a collision course, Zimmerman radioed the plane and ordered it to veer south and climb immediately.

The Msaw system is specifically programmed so the memory stores data dividing approach terrain into a grid with squares measuring two miles on each side. When a plane comes within 500 feet and 30 seconds of the highest obstruction, as the Argentine flight did, a buzzer sounds and the LOW ALT signal flashes.

In New York radar signal data from JFK and Newark airports is sent via land lines to the Garden City Tracon center where the CPU passes it along to radar towers as "bright displays" for daylight viewing and simultaneously to the air traffic controllers.

The north and south towers of the Trade Center are 1,350 feet high but the north tower has a steel television antennae that rises to 1,749 feet, over 200 feet higher than the jet was flying.

Aerolineas Argentinas has been involved in near disasters here three times in the last four years.

When asked if there was a real danger of a collision, Dick Marakovits, chief of air traffic operations for the FAA's Northeast region said, "No doubt about it. Especially since he was on his way down to 1,400 feet."

Wells Fargo Bank Officials Lift Veil of Secrecy Around Fraud

By Bill Laberis
CW Staff

SAN FRANCISCO — Wells Fargo Bank officials have finally lifted the veil of secrecy surrounding the alleged electronic heist of over $21 million, again insisting the inside job was not a computer-assisted fraud.

In recently published reports, bank chairman Richard Cooley disclosed details of a roll-over scheme by which a former branch bank operations manager allegedly engineered the theft.

As related by Cooley, the scheme is nearly identical to one described in a speculative report published in *Computerworld* last week, a report based on a computer consultant's analysis of the fraud.

Bank officials maintain that L. Benjamin Lewis, who disappeared after lunch on Jan. 23 when the scam became unwrapped, effected the heist by electronically transferring ever-increasing sums from one phony account to another, using the expanded credits generated to cover overdrafts in fraudulent accounts.

Lewis is said to have avoided the bank's computer warning system by covering overdrafts and false credit creations within five days of each transaction.

He avoided a second computer safeguard, one signaling an automatic check of transactions over $1 million, by creating 25 small accounts, each containing about $900,000 in credit entries when the fraud was uncovered, the bank said.

Lewis' downfall came when he accidentally filed an improper form recording a routine credit entry in one of the bulging accounts, bank officials claim. "There's no way he could have stopped the scheme in mid-stream without getting caught, so he had to keep it up," said bank spokesman George Caulfield.

At press time, Lewis was still lying low amid reports that he has surrendered to the Federal Bureau of Investigation, although no warrants have been issued in the investigation. The bank has filed a $21.3 million suit charging Lewis and officials of the defunct Muhammad Ali Professional Sports (Maps) with the swindle.

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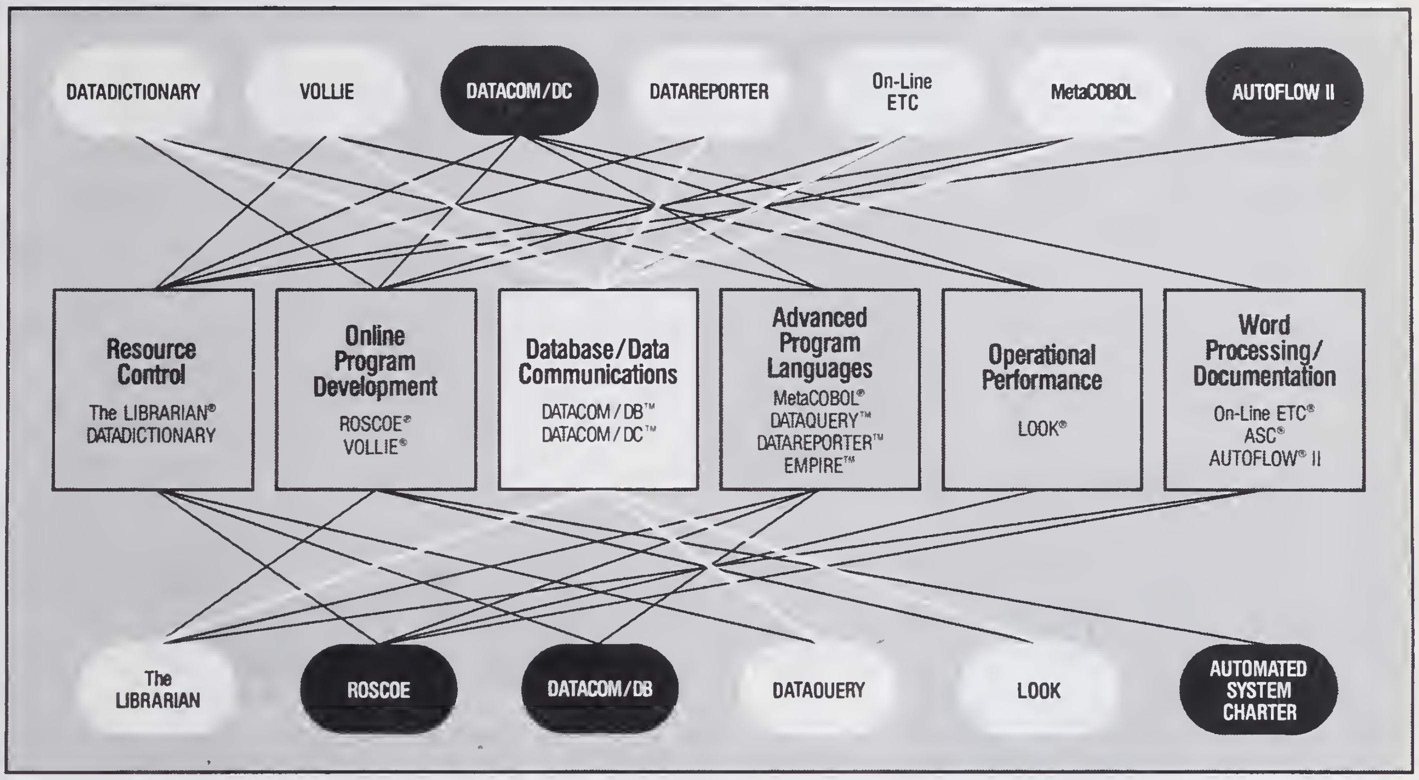

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PE Adds 32-Bit Mini to Rival VAX-11/780

(Continued from Page 1)

For those interested in seeing how many users can fit into a single-processor phone booth, the 3230 can handle about 128 on-line terminals in a typical transaction processing environment.

The cost of the 3230 with 512K bytes of memory, system console, two terminals, an 80M-byte disk and operating system is under $100,000. Initial deliveries for the system — which has been in field testing for about seven months — begin this month.

Like its bookend brothers — the 3220 and 3240 — the 3230 incorporates 16K-bit random-access memory chips, an optional writable control store (WCS) and a floating-point processor.

The system also has a 1K-byte cache buffer that is direct-mapped and organized into 64 16-byte blocks. By using the cache, memory access/cycle time is decreased from 500 to 340 nanoseconds, a spokesman said.

The 3230 does not have the 64K byte/sec common memory bus that is a standard feature of the firm's large-scale 3240 32-bit processor.

Features / System	Maximum Memory in Bytes	Whetstone Benchmark Comparison (Single/Double Precision)	Performance Ratio Average[1]	Cache (Buffer) Size in Bytes	System Cost[2]
Digital Equipment Corp. VAX-11/750	2M	331/165[3]	.57[3]	4K	$158,000
DEC VAX-11/780	8M	753/258; 1,168/756 with floating-point accelerator	1.59	8K	$205,000
Perkin-Elmer Corp. 3220	4M	516/418	1.00	1K	$135,000
PE 3230	8M	682/585	1.33	1K	$145,000
PE 3240	16M	1,172/793	1.92	8K	$185,000
Prime Computer, Inc. 550	8M	433/243	.51	2K	$185,000
Prime Computer, Inc. 750	8M	750/696	1.29	16K	$241,000

1. The Fortran performance ratio averages are computed by Perkin-Elmer Corp. (PE) and include single- and double-precision Whetstone figures, array handling figures, input/-output computations and other mathematical formulas. All of the averages are based on the assumption that PE's 3220 machine holds the normalizing values of 1.00.
2. System prices are for configurations including a processor, 2M bytes of memory, an 80M-byte disk drive, magnetic tape unit and terminals.
3. Fortran performance ratio and single-precision Whetstone comparison for the DEC VAX-11/750 are estimates supplied by PE. The figures do not take into consideration a floating-point accelerator addition, which is available on the VAX-11/780, but not yet offered for the junior VAX machine.

All Figures Courtesy of Perkin-Elmer Corp.

Comparison of 32-Bit Minis

Memory System

The 3230's memory system is currently available in two expansion configurations — one to 4M bytes and one to 8M bytes — and can be boosted in 512K-byte increments, the spokesman continued.

Error-correcting code is standard with the processor and includes an error logger that reportedly records error patterns and spots trends. The error logger can also isolate faulty chips before they affect the reliability of the entire memory system, the spokesman added.

The system's I/O structure has two external communications buses: a multiplexer bus and an enhanced direct memory access (Edma) bus. The multiplexer bus reportedly handles up to 1,023 devices, divided among four interrupt levels, and can accomplish data transfers in two ways: a byte or halfword transferred under I/O instruction control or multiplexed blocks of data transferred between a bus device and the memory.

The Edma bus supports eight high-speed ports directly to and from memory, with each port controlled by a selector channel. Under burst mode, the selector channel can transfer at a rate of 5.71M byte/sec when writing to memory and 8M byte/sec when reading from memory, the spokesman noted.

Since I/O throughput is technically what a 32-bit computer system does "least best," the 3230 incorporates a direct memory access I/O subsystem (Dios) to handle communications lines and offload processor-peripheral transmissions from the CPU. The intelligent communications controller — common to each machine in the 3200 series — allows data transfers to take place with no processor intervention, the spokesman continued.

The Dios subsystem can support up to 63 two-wire or 31 four-wire data communications devices. In addition, the controller handles asynchronous, character synchronous, bit-oriented, SDLC, HDLC and ADCCP protocols.

Remote Diagnostics

The firm's remote diagnostics capability, announced with the 3230, allows the user to have total hardware and software control of the remote maintenance process.

Unlike DEC's remote diagnostics system, which can be initiated by the vendor to keep aware of machine problems, PE's system does not come into play until the user decides it is necessary. PE decided upon this one-way-mirror type of action to ensure system security, which potentially could be breached if a vendor were allowed unchecked access to a user's system, the spokesman noted.

The 3230's floating-point processor offers 48 specialized instructions, as well as single- and double-precision capability. The 3230, 3220 and 3240's floating-point architecture is the only one offered with 32-bit computers that is standardized by the National Bureau of Standards (NBS), the spokesman claimed.

PE decided to work with the NBS on a standard format of floating point architecture for three reasons: one, because of the large number of purchases by the U.S. government, it became necessary to establish some criteria of accuracy; two, PE wanted to make it easier for users to swap programs between 32-bit machines, yet maintain total compatibility; and three, "we just felt it needed to be done," Larry MacPherson, PE's 3200 series product manager, stated.

Another reason for standardization is that double-precision word lengths are slowly giving way to double-double-precision word lengths, particularly in the scientific processing arena, MacPherson said.

And there is increased pressure on 32-bit computers to handle complicated mathematical models.

Writable Control

The 3230's optional writable control store (WCS) offers 2K words of user-programmable memory that can be used to tailor the processor to unique applications — particularly those that are repetitious, the spokesman noted. The WCS development software includes Micro Cal, an assembly-like programming language that reportedly makes it easier for end users to program routines.

By contrast, the WCS languages offered on competitive systems are usually in a binary format that is "incredibly difficult for the user to handle," the spokesman observed. Various support programs are also offered with the 3230's WCS system.

However, unlike the 3240, the 3230 cannot be fitted yet with any prewritten WCS application-specific packages that are tailored for such things as raster control systems for graphics applications, the spokesman added.

Battery Backup

To protect the system against the ever-present gremlins of power failures and brownouts, the memory has a battery backup feature that provides 53 minutes of power for every 1M byte of main memory.

Finally, the 3230 uses the PE standard lineup of 32-bit software including MTM, a development package that supports up to 64 users; OS/32 Text; Fortran VII; Pascal; Coral 66; Basic II; 32-bit Cobol; the DMS/32 data base management system; and transaction controlling packages. All of this software functions under PE's OS/32 operating system umbrella.

PE's Computer Systems Division is located at 2 Crescent Place, Oceanport, N.J. 07757.

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Only IBM Knows for Sure

SQL/DS a Relational DBMS? Rivals Say No

By Marcia Blumenthal
CW Staff

Is it or isn't it a relational data base management system (DBMS)? Well, only IBM knows for sure the true scope of its recently announced Structured Query Language/Data System (SQL/DS) [CW, Feb. 9].

Although competitors will not be able to examine the fine points of the software system until it is shipped next February, they were not reticent during recent interviews about expressing their opinions of IBM's first relational-type software offering.

Most vendors agreed SQL/DS was IBM's blessing on the relational structure, but stopped short of calling it a DBMS — dubbing it instead a query language or access method.

However, Larry Ellison, president of Relational Software, Inc., disagreed. What IBM has released is a complete DBMS, he contended. As yet there is no convenient way to interface the new product with DL/1 or IMS, he noted, but stressed as a stand-alone, SQL/DS is definitely the rumored System R relational DBMS.

Ellison said his firm's product, Oracle, is the same as SQL/DS, except it is geared for Digital Equipment Corp.'s VAX and PDP-11 Systems.

Right now SQL/DS must query the DL/1 data management system and create intermediate SQL/DS tables.

Year Early

Why did IBM introduce the software product a year before it is ready for shipment? Many users of the 50,000 IBM 4300s on order are going to DP shops that currently do not have IBM support or that cannot afford a three-person programmer staff, Ellison noted. SQL/DS is designed to attract this class of user. DL/1 is impossible for the average programmer, he maintained.

Offering the more widely held view that SQL/DS is a query language and access method was Kenneth A. Parker, vice-president and director of marketing at Applied Data Research, Inc. (ADR).

Users are putting pressure on IBM to come out with more user-oriented facilities, he stated, dubbing SQL/DS a stopgap for IBM.

Another industry observer, who asked not to be identified, criticized IBM for announcing a software product a full 12 months before support was available. IBM would not do that unless it was under pressure, he noted, adding that based on the delivery date of this product versus earlier ones, IBM introduced SQL/DS seven months too early.

"Independent vendors are making progress in end-user tools and IBM doesn't have any end-user tools except QBE," he stressed. IBM does not have a proven track record in software like it does in hardware, he added.

Resource Hog

ADR's Parker emphasized that a full-blown SQL/DS system requires about 2M bytes of main storage. Since the system is targeted at the medium-sized DOS/VSE environment, Parker questioned the system's operational attractiveness.

Parker maintained ADR's Datacomm system incorporates 70% of a relational DBMS using a trivial amount of CPU overhead.

There seems to be universal agreement that SQL/DS is a resource hog, said Herb Edelstein, vice-president of International Data Base Systems, Inc. (IDBS). IDBS produces a DBMS called Seed which is hybrid of relational and Codasyl types of systems.

Because of the low $300 monthly licensing fee for SQL/DS IBM may be using the product to propel add-on sales of equipment such as disk drives and memory, Edelstein speculated. But questioned whether the tradeoff between more low-cost hardware and higher priced people resources is necessary. IBM seems to have indicated such a tradeoff is inevitable.

Pacesetting Ability

IBM has established SQL/DS as a standard for a relational system and for ease of use. This will certainly present independent vendors some problems educating their users and new prospects, Edelstein said.

Although recognizing IBM's ability to set the pace for the market, Frank Fish, vice-president of marketing at Mathematica, Inc., noted SQL/DS does not offer the productivity requirements necessary for new software products. The product only attacks a portion of the whole problem. SQL/DS only addresses query, but does not address problems in data validation and data management, he said.

Because IBM announced SQL/DS for the DOS/VSE environment, Fish questioned the system's eventual portability: "IBM has not had a good history in the software portability arena."

Although most competitors called the $300 monthly license fee "cheap," they did not dwell on the competitive implications of the price.

With that price, IDBS' Edelstein doubted whether IBM would make SQL/DS a profit center. By contrast, he noted Software Ag's Adabas for the DOS/VSE environment costs about $100,000.

Control

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Honeywell Forecasts Changes in CP-6 Base

By Jeffry Beeler
CW West Coast Bureau

LOS ANGELES — The next few years will likely bring fundamental changes in the composition of Honeywell, Inc.'s Control Program -6 (CP) customer base, according to Michael Keliher, head of the company's domestic marketing and services operation.

Today, the CP-6 user population consists entirely of former Xerox Corp. Sigma systems customers who have migrated to one of Honeywell's high-end Level 66/Distributed Processing Systems (DPS) mainframes.

But during the next two years or so, the traditional CP-6 customer base will gradually give way to a growing number of users whose computing backgrounds are in processors other than the Sigma systems family, Keliher predicted last week at the 33rd annual meeting of the Exchange Users Association.

Expanded Focus

Keliher attributed the expected influx of non-Xerox systems users to a recent expansion of Honeywell's CP-6 product focus. Honeywell originally developed the operating system as an upgrade path for Xerox's CP-V customers, who Honeywell acquired when the Sigma systems vendor withdrew from the mainframe ranks in 1976.

Now, however, Honeywell is revising its plan in an attempt to extend CP-6's use into other sectors of the company's large-systems user base, Keliher said.

In particular, the firm is targeting CP-6 at DPS customers with no previous ties to the old CP-V operating system, he added.

Major Step

Honeywell's effort to expand CP-6's field of potential users reportedly took a major step forward two weeks ago when the company added four models to its DPS-8 line of high-end mainframes [CW, March 2].

In their model numbers, the four additional processors — which include the DPS-8/20C, DPS-8/44C (in both single- and dual- CPU configurations) and DPS-8/62C — are nearly identical to an older quartet of DPS-8 systems that Honeywell introduced in October 1979.

But unlike the 1979-vintage machines, whose software support was limited to Honeywell's Gcos operating systems, the most recent additions to the DPS-8 family are compatible with CP-6 as well. In essence, Honeywell has now extended CP-6 support to all the existing members of its high-end systems line except the DPS-8/52, a CP-6 version of which is said to be scheduled for introduction late this month.

First installed in mid-1979, CP-6 enjoys the distinction of being the third operating system to be made available with Honeywell's large-scale mainframes.

The other two products include Gcos and Multics.

Complementary Systems

Each of the three DPS-8-compatible operating systems "complements" the other two and is optimized to perform a different class of applications, according to Honeywell Information Systems president Stephen Jerritts. Gcos is geared primarily to heavy production jobs, whereas Multics is intended mainly as a software-development tool.

CP-6, meanwhile, is aimed primarily at applications involving large numbers of interactive users. Because of its ability to support real-time processing, the operating system is particularly well suited to users like universities and Fortune 1,000 companies, both of which will be among the main targets of Honeywell's expanded CP-6 product plan, Keliher said.

The latest CP-6 update, christened the B00 release, was introduced last December and will reportedly be followed this coming June with a second version known as the B01 release, which will contain additional transaction-processing facilities such as distributed forms processing and automatic application sharing.

By mid-1982, Honeywell plans to add yet another enhanced CP-6 release tentatively referred to as C00, according to George Gillette, director of the company's Los Angeles development center.

C00's main features will include electronic document distribution, productivity aids for both computing professionals and novices and the ability to interconnect multiple hosts.

HP Hiking Prices 5%

PALO ALTO, Calif. — The prices of most Hewlett-Packard Co. computer products will go up 5% on April 1.

The price hikes are "broadly effective" on HP computer systems, peripherals, software, training programs and service contracts, a company spokesman said.

For example, the top-of-the-line HP 3000 CPU, the Series 45, will carry a $114,000 price tag instead of its previous $109,750, the spokesman noted.

Some recently introduced products will escape the price hikes. Among them are the HP 2680, a laser printing system; the HP 1000L line of microcomputers; and main memory for HP 1000 computers.

"After two years of constantly rising costs which have not been reflected in any significant price increases, Hewlett-Packard finds these adjustments now necessary," according to Paul C. Ely Jr., HP executive vice-president and general manager of the firm's Computer Groups.

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CPUs Join Investigation Of Atlanta Child Slayings

(Continued from Page 1)

given "absolutely the highest, topmost priority in the shop."

Police garnered thousands of tips recently when the system automatically phoned 150,000 Atlantans in selected neighborhoods begging bits of clues, no matter how incidental. The overall DP effort is the first large-scale use of computers in a nuts-and-bolts investigation of a major crime, officials here said.

Pattern Recognition Program

Although the system has been used in the past in Atlanta, as in other major cities, as a crime data base, its use now to collate a sea of information relevant to one string of apparently related crimes is "definitely an exception," Beverly Harbard of the Atlanta Public Safety Office said.

While one CPU at City Hall provides on-line entry for the array of field investigators, the other supports a pattern recognition program using "key word" searches when combing the growing data base, Roy explained.

"Without showing our hand, I can say that the system allows us to forge links between individual cases, to pick out recurring patterns," Roy said. "Of course, several patterns have emerged. The system is handling a tremendous amount of police data about the murders."

Vital police and FBI files, developed before the crime program commenced running last August, have also been integrated into the system, which is itself linked to the computers at the FBI's main office in Washington, D.C., and to the state's criminal investigation office.

The system is accessible 24 hours a day via an expanding network of remote terminals, Roy said.

Electronic Brains

Investigators are further picking the electronic brains at the National Crime Information Center in Washington, D.C., using the data base of the Behavioral Science Unit to sketch a composite character type, according to FBI Special Agent Dick Berry in the Atlanta office.

The bureau, he said, was ordered into the investigation in November last year by then-Attorney General Benjamin Civiletti.

"The computers now are performing some invaluable services in the investigation, given the volume of data being generated," Berry said. "We are progressing. But I guess the whole thing has boiled down to good old hard-nosed detective work.

"Using the system is all part of an unparalleled and obsessive effort to end this nightmare," Harbard added. "It has helped us arrive at the feeling that there is more than one person involved, more than one killer, although not operating together. I guess that is somewhat disconcerting."

She Slashed It 83%

High Turnover? Try Lourie Davis' Approach

By Lois Paul
CW Staff

TULSA, Okla. — If your DP department is beginning to resemble a revolving door with more people going out than coming in, maybe you should try Lourie Davis' approach.

Davis began training clerical employees as programmers, added career path and technical training for all levels of employees, threw in a competitive salary program — and slashed turnover by 83% in three years at Blue Cross and Blue Shield of Oklahoma's Computer Services Division here.

The division had a 50% turnover rate in 1977. The new policies were instituted in 1979, and the rate dropped to less than 9% in 1980.

Nine employees are halfway through the company's programming trainee course, and five of them have already been placed in better jobs. Three will move into teleprocessing openings, one will be a DP auditor and another will join Davis' department, Planning and Control. Davis said the remaining four probably will be placed soon.

Training Requirements

Every employee in the Computer Services Division is required to enroll in at least 40 hours of career path training every six months during office hours. These courses include introduction to IMS, DL/1 programming, cost benefit analysis, technical writing and project management concepts.

During 1980, employees earned 2,881 hours in 29 individual subjects. This includes technical training contracted for with Advanced Systems, Inc. (ASI), as well as in-house courses taught by Blue Cross personnel in their own specialties. Over 140 employees completed at least one course.

When workers complete training in certain areas, they are eligible for advancement, Davis said. This is in addition to a regular six-month salary review conducted by the company's personnel department which attempts to bring wages "in sync" or perhaps a little higher than those offered for equivalent jobs in the Tulsa area. Salaries and grade levels of Blue Cross employees are adjusted, as needed, after each six-month review, Davis said.

Commenting on the effectiveness of the training programs, Davis said that some employees who have been with the company only three and a half years have advanced to the systems analyst level and are performing very well in this position.

She attributes the drastic reduction in turnover directly to the company's new training and salary policies. "A lot of the people feel that as long as they are being challenged and trained, have the opportunity to do interesting work and are being paid well, there is not much reason to go somewhere else."

Davis became head of planning and control in 1979. Her first move was to organize an executive training session that brought in IBM representatives to teach Blue Cross vice-presidents about computer usage in management.

The Computer Services Division currently uses an IBM/158 with OS/-VS-1, but is in the process of installing an IBM 370/168 and will convert to MVS by the end of 1981. The system has 8M bytes of memory and uses IBM 3350 dual-density disk drive storage. The division has about 120 CRTs that are a mixture of equipment from IBM and other vendors such as Telex Corp. The department performs most of its programming in-house, Davis said.

Davis and several other Blue Cross DP professionals teach the bulk of the programming trainee course. The students are learning Cobol, assembler language coding, JCL, Easytrieve and systems analysis. Upon graduation, they will be considered trained to the associate degree level, she said.

Next on the drawing board for Davis is an expansion of the training program to include major systems training for all employees responsible for interfacing with each of the company's major production systems. This will include over 200 people in as many as 10 different departments in four major corporate divisions.

"We want to train them to make the most effective use of the systems," Davis said, noting that this should result in higher quality, increased productivity and enhanced customer service.

Marconi Fellowship Awarded to Papert

CHELMSFORD, England — Dr. Seymour A. Papert, professor of mathematics and education at MIT, has been awarded the $25,000 Seventh Marconi International Fellowship.

Papert, who can use the grant to originate or complete the project of his choice, was honored for his work in computer education and in particular the development of the Logo language, which he designed for children.

The system has shown itself to be particularly useful in the education of children suffering from cerebral palsy.

More information on the Marconi International Fellowship is available from Peter Baker at Marconi House, Chelmsford, England, CM1 1PL.

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Is Mafia Going Electronic? Evidence Suggests

(Continued from Page 1)

advantage of whatever devices were available to maximize its gains. As one former investigator put it, "You're not likely to see grass growing beneath their feet."

But that is about as far as they will go. Federal organized crime investigators, including the U.S. Department of Justice Strike Force teams in major U.S. cities, insist there is no hard evidence linking organized crime with widespread computer use and abuse.

Anyone's Guess

"I can say that there is nothing in the public record that has resulted in criminal or civil pleadings connecting organized crime and that kind of activity," said FBI agent William Robertson in Newark, N.J.

"Of course, the computer is being so widely used, and a small one can be secreted anywhere. But are they being used much by the mob? My guess would be as good as anyone else's," he added.

"It's quite possible that kind of thing is out there, quite possible," commented Wiley Thomson of the FBI's Washington, D.C. bureau. "We really don't know too much about it. Haven't come across it, anyway."

The agents' opinions were largely mirrored in statements from FBI and Strike Force investigators in New York, Los Angeles, San Francisco, Boston and Chicago: Yes, organized crime may be using computers and engaging in some computer fraud; No, there is nothing of public record to prove it.

Investigators were quick to point out that the Mob would have a lot to lose, for example, if computerized records of a gambling operation were seized in a raid. Virtually an entire network of clients and runners would be exposed, ruining a mobster's toehold on local operations.

But the other side of the coin is that mob operations are much like those of any other business: The greatest profits accrue to those with the lowest costs.

"I know it sounds a bit farfetched, but mobsters can face the same labor problems as legitimate businesses, especially in something like a numbers racket," Jack Bologna, computer operations consultant and former federal investigator, said.

"It takes a lot of people, runners, collectors and the like, to run a numbers or sports gambling racket," Bologna said. "I'd say computerizing a gambling racket could meet this large problem directly, reducing overall costs. Why not?"

Bologna said that some Mob activities such as drug dealing — its biggest single operation — are not directly conducive to computerization. "It's transactional crime where the transactions are few and large," he explained. "Control is not really a problem there, especially with a good distributive network."

In loansharking, Bologna said, the Mob's recordkeeping is "pretty rudimentary and has been for some time. But as the dollar amounts grow over time with inflation, some tighter control will become necessary. So they throw a loansharking program onto a computer in one of their so-called legitimate businesses. Who's going to know?"

Three Possibilities

While saying that an organized crime-computer connection is "tenuous, following no particular pattern," computer consultant Donn B. Parker of SRI International, Inc. near San Francisco expects the Mob will become involved with computers in three ways.

First, as its legitimate businesses — from cheese factories to car dealerships — grow in size and sophistication, they will require more computerized records. The Mob's computer savvy will grow, and so will more widespread computer applications in its illegal businesses, Parker said.

Second, the Mob will become more active in computer fraud, particularly large-scale electronic funds transfers (EFT) crime, Parker predicted.

Third, Parker foresees a Mob assault on the nation's criminal justice computers, such as the FBI's voluminous crime data base in Washington, D.C. Parker said there has already been one reported case where a U.S. Justice Department consultant was caught selling computerized crime dossiers to Mob elements.

Both FBI and Justice Department officials said they would be hard pressed to effectively fight any widespread use and abuse of computers by organized crime.

Said one Strike Force investigator, "They function almost at will as it is. If they streamline their operations with computers — if they haven't already — our work will only be the tougher for it."

Stripped bare of the skull busting, petty extortions and other trappings of a strong-arm, "cement shoe" mentality, the Mob's activities, legal and not so legal, are quite businesslike. What distinguishes Mob operations from those of other American businesses, more than anything else, is their incredible profitability. Government estimates place the Mob's profit margin at 30%, for a gross profit last year of approximately $50 billion.

"They earned those profits over the decades largely becuase of their implacable ability to adapt to change, giving the people what they want," said a federal Strike Force investigator.

"You're talking a business grossing maybe a half billion dollars every day, seven days a week," he added. "If they're not using computers to keep track of at least a part of that, I'll be damned surprised."

Illegal Gambling

The Mob's estimated illegal gambling receipts last year approximated IBM's gross from its combined national and global operations, about $28 billion. Most of this was derived from sports betting — reportedly flourishing — and from the steadfast numbers rackets, as well as from illicit pari-mutuel track betting.

There seems little doubt that Mob elements are making at least token use of computerized systems to keep track of their sprawling, all-pervasive gambling network. After all, gambling by its very nature lends itself to computerization.

A simple program run on a desktop computer can accurately maintain an updated inventory of thousands of bets placed, total take, payoffs based on programmed odds and win-lose betting histories of a racketeer's clients. That such programs are in fact being run, and with increasing frequency, seems obvious, despite the FBI's insistence to the contrary.

Two years ago at Sandia National Laboratories in Albuquerque, N.M., a systems analyst, a well-paid, well-respected Ph.D.-holder with "acute security clearance," was caught red-handed using the lab's mainframe to create a sports betting program. Sandia, a division of Bell Laboratories, specializes in highly sensitive government work, including atomic bomb research.

Using a court-ordered wire tap, investigators intercepted a phone call from a local bookie made to the analyst. Police said the call was part of a test run to prove the system could work "on the street."

"We grabbed the disk file the next day, blind luck that we found it," said Lee Hollingsworth, computer director at Sandia. "It was a program that allowed entry of odds, point spreads, bets, profits, the whole thing. It was a turnkey program, written in Basic, and it was on its way out the door to the street when we got it. And it was damn easy to develop and probably sell."

Hollingsworth said the analyst was linked to local racketeers and was reportedly in their debt from his own

Bell Foes Pursue Objections to Inquiry II

By Phil Hirsch

CW Washington Bureau

WASHINGTON, D.C. — Another round of objections to the Federal Communication Commission's (FCC) "final" Computer Inquiry Decision has been filed by AT&T's competitors.

Under the decision adopted last December, AT&T can begin marketing terminals and enhanced services — for example, videotex, electronic mail and other on-line information offerings — through separate subsidiaries beginning March 1, 1982. The critics want the manufacturing and research and development of these products and services to be similarly separated. They insist that if Western Electric Co. and Bell Laboratories are allowed to work for the subsidiaries as well as for AT&T operating companies — the arrangement allowed by the computer inquiry decision — AT&T will be able to surreptitiously cross-subsidize the products and services offered by the subsidiaries with revenues earned from its telephone network customers.

Late last month, a petition asking the FCC to reconsider this part of the decision was filed jointly by the Independent Data Communications Manufacturers Association (IDCMA), chief Washington voice of the nation's modem makers. Joining IDCMA were two other trade groups — the Computer & Communications Industry Association and the North American Telephone Association. Along with this joint petition, the FCC received one from Satellite Business Systems (SBS) expressing similar sentiments.

All four groups were responding to an earlier filing by the National Telecommunications and Information Administration (NTIA), the chief spokesman for the White House on telecommunications matters. Last January, NTIA Administrator Henry Geller, just before he resigned with the rest of the Carter Administration, advised the FCC to require separation of manufacturing/R&D activities related to products and several marketed by the new AT&T subsidiaries. But NTIA said this question should be addressed in a new rulemaking — a "Computer III" inquiry in effect.

IDCMA and the other three groups oppose NTIA on this latter point. They fear that a rulemaking will defer the whole separation question beyond March 1, 1982, the date AT&T — as things stand now — can begin marketing enhanced services and competitive products through separate subsidiaries.

"It is imperative," SBS said, "that the commission ensure that sufficient controls are in place, such that AT&T's ability to cross-subsidize is removed before the subsidiary begins operation."

AT&T, in its response to the NTIA petition, recommended trying out the rules established last December before tinkering with them. "The separation conditions . . . are subject to modification if experience and the evolution of the business environment so warrant," NTIA said.

'Interminable Delay' Predicted For Communications Act Repeal

CW Washington Bureau

WASHINGTON, D.C. — "Interminable regulatory delay" will be the chief result of repealing Section 222 of the 1934 Communications Act, Western Union International (WUI) told a Senate subcommittee late last month.

The company's comment was the latest development in the continuing battle between international record carriers (IRC) and the telegraph company over the question of whether Western Union should be allowed to get into the international record communications business. Legislation introduced by key members of the Senate subcommittee would accomplish this by repealing Section 222, enacted several years ago; it limits the telegraph company to provision of domestic record services.

Th IRCs want Western Union to agree to interconnect its network with their facilities before Section 222 is repealed; the telegraph company is willing, but there is a Grand Canyon-size difference of opinion concerning interconnection terms and conditions.

In its recent statement to the subcommittee, WUI argued that repeal of Section 222 before the interconnection question is settled would put Western Union in a much better bargaining position.

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Growing Computer Abuse in Organized Crime

sour gambling habit.

Similarly, in Tulsa, Okla., two years ago, police seized an Apple Computer, Inc. Apple II and a printer during a gambling raid. A friend of the police chief cracked the program code, "and the poor little Apple spilled its guts," police Lt. Drew Diamond said.

What police found was an elaborate gambling accounting program, capable of processing and filing bets and payoffs as well as listing the names of hundreds of local bettors involved in sports gambling.

Police said the bookie arrested in the case was using the printer as an addressograph to mail out his racing forms.

In addition, the system was equipped with a "raid button" designed to destroy the program, but the police got to the equipment before the button could be pressed. Police do not know how the program was obtained, but said it would probably not be difficult to buy another.

Drug Traffic

With estimated annual revenues of over $60 billion, drug trafficking easily ranks as the Mob's No. 1 money producer. And while there is little evidence the Mob is using computers to monitor drug movements and inventories, it is clear that it extensively uses sophisticated electronic funds transfer (EFT) to launder the staggering cash flow generated by its drug trade.

"You have to realize that the Mob is very sophisticated in the field of international money transfers, and has experience that goes back to the Prohibition of the '20s," said Jack Bologna, a computer operations consultant and former federal investigator.

"They bought booze then in Canada and Britain, and learned well how to move cash from bank to bank to pay for it over there," he said. "They are very cagey in such matters."

Using computerized funds transfers and an acquired knowledge of international banking networks, the Mob has laundered billions in drug money, Bologna said. A typical money transfer might see funds transferred from an account in Miami to an offshore Dutch bank in the Caribbean, then to a numbered Swiss account and finally to a cocaine or marijuana dealer in Colombia.

"All done from the computer terminal, neatly and quietly," Bologna said.

Sophisticated Hijacking

Utilizing a string of legitimate business fronts that permeates virtually every segment of the economy, the Mob operates a fencing network that is a complete soup-to-nuts market. Much of the fenced contraband is the product of sophisticated hijacking, and there is mounting evidence that computer manipulation is helping to make it happen.

One celebrated case of the early '70s saw 230 railroad cars rerouted a full two-days ride away from their intended destination. Police said the Mob had accessed a railroad company's computer to pull off the heist, and that it was weeks before the scam was discovered.

Crime officials in the Newark, N.J., area said privately they suspect similar computer scheduling manipulations in the trucking industry are making it easier to hijack semitrailers destined for the New York markets. Mob operations are facilitated both by the Mob's reputed warehouse control in northern New Jersey and further by its alleged control over some of the powerful Teamsters Union locals there.

In line with its well-oiled fencing network, there is some speculation that the growing market in stolen microchips and integrated circuits may involve the New York Mob, functioning as a conduit through which as much as $20 million in pilfered chips pass annually.

Last month, two California men were arrested and charged with counterfeiting 10,000 stolen chips eventually sold to Siemens AG in West Germany [CW, Feb. 23]. While it is unclear just who sold the chips to Siemens, investigators said they had been monitoring the activity of a "questionable third-party dealer in Bloomfield, N.J."

"I'd say there is a growing concern about an international ring selling stolen microchips, particularly to computer and toy manufacturers in West Germany and Japan, where they fetch a good price these days," Bologna said.

Mob influence in the proliferation of electronic funds transfer (EFT) fraud is difficult to gauge because so many cases go unreported or undetected. But at least one man, described by the U.S. Attorney's office as a Mafia soldier in the Genovese family, is behind bars following his conviction in a $3 million EFT heist from Citibank in New York.

Anthony Giacalone was sentenced last December to a federal prison term for allegedly helping launder the money electronically lifted earlier by a bank employee.

The attorney general's office charged that Giacalone helped funnel the money, using international banking connections, from New York to three international banks before it was returned, thoroughly laundered, to New York where it was then withdrawn and never recovered.

"It's difficult to say to what extent the Mob was involved in this case," said a computer security officer at Citibank. "But it's clear that there were sophisticated and organized crooks operating simultaneously on three continents. I guess that says something."

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Competition to IBM Heats Up

Analysts See IBM's Mini Line Most Vulnerable

By Tom Henkel
CW Staff

IBM's minicomputer line is probably the most vulnerable set of processors the firm makes, industry analysts agree.

The two processors that gave IBM a strong footing in the minicomputer market, System/32 and System/34, are getting old; and replacements to those systems will face hot competition in a hectic marketplace.

IBM's Series/1, which has been called everything from a potential replacement for the System/32 to an OEM product that experienced more success than IBM originally thought, recently was given a memory boost and stiffer distributed data processing capabilities that most analysts agree makes it more competitive among tough competitors like Digital Equipment Corp.'s PDP-11 and Data General Corp.'s Eclipse S/130.

At the upper end of the spectrum, IBM's System/38 has been called the best processor the firm ever offered. But while System/38 orders seem strong, some potential System/38 customers have been turned away by the processor's uniqueness.

IBM's General Systems Division (GSD) is rumored to have several mid-range and high-end processors on the drawing boards, but none of those processors will be announced until at least the end of 1981 and possibly later, according to industry analysts.

First up on the announcement schedule will be an enhancement or replacement to the System/34. While consulting firms like the Yankee Group said IBM may introduce a new System/36, other analysts like the Gartner Group said System/36 is dead. Instead, IBM will announce a bigger System/34, they claim.

The System/36 theory tends to take one of two bends. Some said it will be a scaled-down version of System/38, while others said it will be a scaled-up System/34.

The Gartner Group's David Stein said it will be neither. IBM seems to have problems in making its smaller System/38 Model 3 efficiently run all the software necessary.

With that in mind, he said IBM is not ready to announce a smaller System/38 at this time. However he added IBM may make such an announcement in 1983. On the possibility of an expanded System/34, Stein said the System/34 processor cannot be significantly enhanced beyond its current state. Therefore, the only enhancements IBM could make are memory increases, which would not constitute a new series, according to Stein.

System/33

A recent Yankee Group study also mentioned the possibility of a mid-range upgrade for the System/32 called the System/33. The system could be configured with four to eight terminals, and languages would include the traditional RPG-II and possibly a subset for System/38's RPG-III.

This processor, the Yankee Group said, will fit between IBM's 5100 line of desktop processors and System/34. System/33, however, will offer a better price/performance ratio than the older System/34, but will not offer the technological advances of System/38.

System/33 is estimated to cost in the $35,000 to $55,000 range and, according to the Yankee Group, will be announced in late 1981 or early 1982 — although Gartner's Stein disagreed.

Despite Stein's contention that the System/36 project is dead, the Yankee Group said it is alive, well and looks a lot like System/38.

The mid-range processor is said to be under development with a high-end System/38, System/40. The three processors will constitute an upwardly compatible line, similar to the way IBM has developed its much larger 3033 line, the Yankee Group said.

System/36 will support up to 35 terminals, will support either bisynchronous or SNA/SDLC communications and, like System/38 will support RPG-III and Cobol. The processor would require less program support than System/38 at a lower monthly rental and purchase price.

The Yankee Group also spoke of problems with the System/36 program, namely the lower than announced performance on the System/38 and higher than expected memory requirements.

But unlike Gartner's Stein, the Yankee Group said IBM will overcome these problems and begin shipping System/36 in the second quarter 1982 to first quarter 1983 range.

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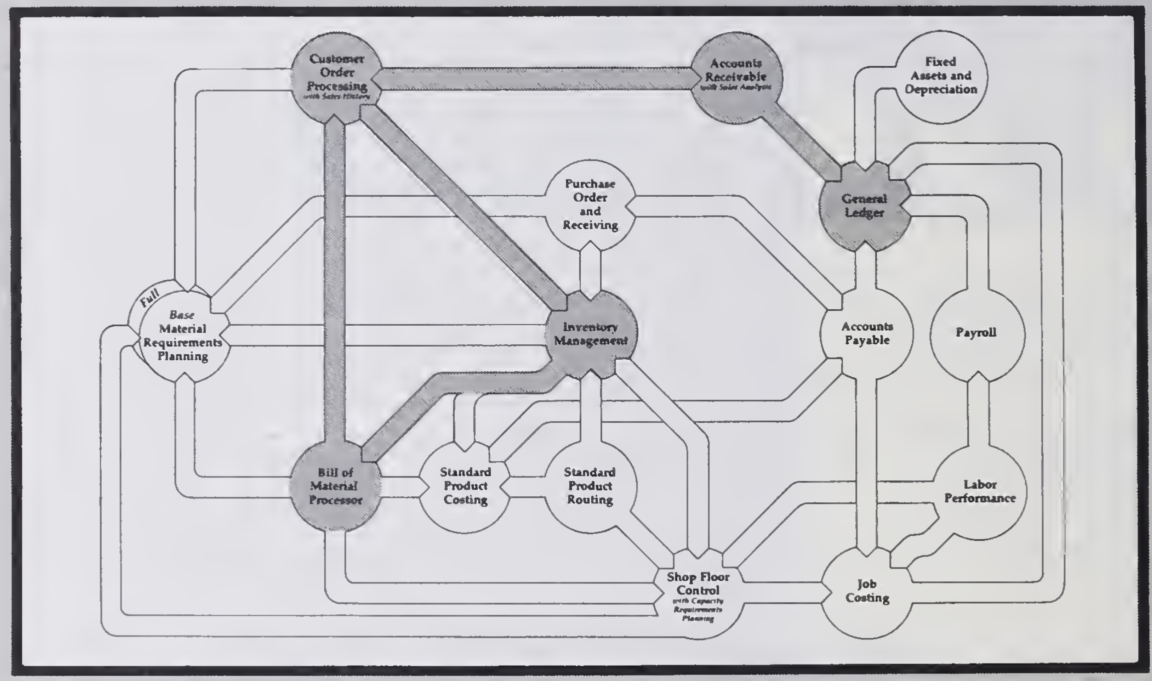

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For Some GSD Systems, There's No Comparison

By Tom Henkel
CW Staff

ATLANTA — Five of the systems made by IBM's General Systems Division (GSD) here were designed to appeal to the same user: the small to medium-sized business.

But aside from their targeted end user, they do not seem to have anything else in common — and there does not seem any way for a potential buyer to compare them. For example:

- If you want to buy a Series/1 machine, you have a choice of three CPUs, and each one takes a different operating system.
- The System/32 and System/34 seem similar, but each employs a different architecture.
- The System/3 Model 15D uses the same 16-bit architecture as the System/34, but it runs under a different operating system and requires more programming expertise.
- The top-of-the-line System/38 is more like the Data Processing Division's 4331 processor than its GSD cousins.

While IBM's larger systems, which can more easily be compared, are general-purpose computers, the GSD systems are for the most part applications processors. For GSD products, therefore, the application is in many ways more important than the processor. And a good application on a less powerful processor may be better than a less suitable application on a more powerful processor, the Yankee Group has hypothesized.

The only equalizer for GSD products seems to be price. The user tends to get more functionality the more he pays, according to the Yankee Group.

While many GSD systems support the same languages, such as Cobol, Fortran and RPG-II, the systems use different compilers. Therefore, the fact that two systems support the same language does not mean they are fully software compatible, the Yankee Group said.

Migration Paths

Migration paths give some clue to the hierarchy among GSD products. For example, a System/32 can be rather easily migrated to a System/34, and the low end of the System/3 line can also be migrated to a System/34. But users of larger System/3 processors, the System/3 Model 15D, for example, would not benefit from migrating to a System/34.

IBM offers users of both System/34s and System/3s migration packages to a System/38, but both conversions may require a moderate to high effort, according to the Yankee Group.

The Series/1 is in a class by itself. IBM does not offer conversion packages for migration to any other processor. To make matters even more complicated, the Series/1 is not one specific processor.

There are three operating systems available on the Series/1. The Realtime Programming System (RPS) can be used for program development or to run business applications. The Event-Driven Executive (EDX) operating system can also be used for applications processing as well as process control and data management functions, the Yankee Group said.

The Control Program Support (CPS) operating system is used for communications processing in distributed networks. In short, Series/1 can be used as three totally different processors, according to the Yankee Group.

Unique Architecture

The Series/1 architecture is also somewhat unique, compared to other IBM processors. While the Series/1 can be used in distributed environments with a larger host, a migration out of the Series/1 family would require extensive changes in code and files. In other words, the user would virtually have to revamp his mode of operation the Yankee Group said.

System/38 can also be called unique. It is the only GSD processor that offers a data base management system, virtual storage management and support for IBM's latest version of the RPG programming language, RPG-III.

Like Series/1, however, IBM does not offer a conversion package to migrate from System/38 to any other processor. So users currently only have one viable System/38 model to work with, the Model 5. A smaller Model 3 was also released by IBM, but IBM watchers say the System/38 software — which was revised after IBM was forced to delay delivery of the processor after some operating system problems — is too extensive for the smaller model.

Several users with System/38s on order supported that accusation by saying their IBM sales representatives suggested they switch Model 3 orders to the larger Model 5. IBM, however, has not formally made such an announcement.

> *GSD systems are for the most part applications processors. For GSD products, therefore, the application is in many ways more important than the processor. And a good application on a less powerful processor may be better than a less suitable application on a more powerful processor, the Yankee Group has hypothesized.*

GSD SERIES/1 SYSTEMS

Characteristics / Processor[1]	Series/1, 4952	Series/1, 4952C	Series/1, 4955
Relative Performance	1	1	3
Main Memory (in bytes)	32K-128K	32K-128K	16K-256K
Memory Cycle Time (nsec)	Not Available	Not Available	660
Architectures (Word Size)	16-Bit	16-Bit	16-Bit
Communications	Bisync or SNA/SDLC^{3}	Bisync or SNA/SDLC^{3}	Bisync or SNA/SDLC^{3}
Workstations	256^{4}	256^{4}	256^{4}
On-Line Storage (in bytes)	512M-540M^{5}	512M-540M^{5}	512M-540M^{5}
Data Base Management System?	No	No	No
Languages	Cobol, Fortran, Basic, PL/I	Cobol, Fortran, Basic, PL/I	Cobol, Fortran, Basic, PL/I
Printers	40-120 char./sec, 150-300 line/min	40-120 char./sec, 150-300 line/min	40-120 char./sec, 150-300 line/min
Purchase Price	$4,600	$8,500	$11,550
Lease Price (Term)	None	None	None
Production Status	New	New	New
Operating Modes	Batch or Interactive	Batch or Interactive	Batch or Interactive

CW Charts, Information Courtesy IBM and The Yankee Group

OTHER GSD SYSTEMS

Characteristics / Processor[1]	System/32	System/34	System/3-15	System/38 Model 5	4331 Group-1	4331 Group-2
Relative Performance	5	16	28	86	49	93
Main Memory (in bytes)	16K-32K	32K-256K	48K-512K	512K-2M	512K-1M	1M-4M
Memory Cycle Time (nsec)	600	600	Not Available	600	Not Available	Not Available
Architectures (Word Size)	8-Bit	16-Bit^{7}	16-Bit	48-Bit	24-Bit	24-Bit
Communications	Bisync or SNA/SCLC^{3}	Bisync or SNA/SDLC^{3}	SNA/SDLC^{3}	Bisync or SDLC	SDLC/BSC	SDLC/BSC
Workstations	1	16 Local, 64 Remote	30 Local, 90 Remote	80 Local, ∞ Remote^{2}	Not Available	Not Available
On-Line Storage (in bytes)	3.2M-13.7M	8.6M-257.4M	50.8M-508M	64.5M-2,673M	Not Available	Not Available
Data Base Management System?	No	No	No	Yes	Yes	Yes
Languages	RPG-II, Fortran, Assember, Cobol	RPG-II, Basic, Assembler, Fortran, Cobol	RPG-II, Cobol Assembler, Fortran	RPG-III, Cobol	Cobol, Fortran, RPG, PL/I^{9}	Cobol, Fortran, RPG, PL/I^{9}
Printers	40-120 char./sec, 50-2,851 line/min	40-120 char./sec, 160-6,501 line/min	100-1,100 line/min	40-120 char./sec, 160-6,501 line/min^{2}	40-120 char./sec, 200-1,200 line/min and up	40-120 char./sec, 200-1,200 line/min
Purchase Price	$24,425-$36,695	$20,310-$88,660	$83,770-$109,280	$70,210-$194,245	$68,250-$76,100	$150,000-$197,100
Lease Price (Term)	$970-$1,858 (4-Year)	$909-$3,248	$3,725 $5,747	$1,890-$5,505	$1,895-$2,115	$4,580-$5,900
Production Status	Not New	New	Not New	New	New	New
Operating Modes	Batch Only	Batch or Interactive	Batch or Interactive	Batch or Interactive	Batch or Interactive	Batch or Interactive

CHART FOOTNOTES

1. GSD systems have different instruction sets, hardware characteristics and communications capabilities. These ratings are intended to represent GSD system capabilities in a small to medium-sized business applications environment with a minimal amount of communications processing.
2. There is no physical limitation on remote workstations. The only limitation is a particular site's system resources.
3. IBM's SDLC protocol is available only under the RPS operating system.
4. The Series/1 has an address device range of 256 terminals/workstations. However, multiplexing features are available to extend the number of workstations.
5. IBM does not specify a limit on disk storage. However, the logical maximum is 512M-540M bytes.
6. Relative performance based on a System/32 processor's equaling 5. Relative performance numbers were compiled by The Yankee Group and are based on user experience. The Yankee Group notes, however, that speed alone is not a judging factor in applications processors. And the numbers are intended only as a guide. Furthermore, the 4331 and 4331-2 processors were given relative performance numbers based on the GSD scale. These numbers were derived assuming the 4331 processors were to be used as applications processors. Therefore, in a general-purpose computing environment, previously published performance numbers for the 4331 and 4331-2 hold true.
7. Processor uses two 8K bits.
8. Pricing is for the CPU only. Console and other hardware prerequisites are not included.
9. Languages used depend on operating system.

IBM Gearing Up to Take On Competition

By Tom Henkel
CW Staff

NEW YORK — The threats to IBM's position as the No. 1 computer company are mounting.

Network communications suppliers such as AT&T and Xerox Corp. are eyeing IBM's processor market like hungry cats on a cold night. New computing services vendors are cropping up, and IBM is facing tougher than ever competition for its share of the minicomputer market.

But IBM has not remained No. 1 by being passive, and Yankee Group President Howard Anderson says IBM is ready to fight back.

Speaking here at the firm's recent conference, "The Refocusing of IBM," Anderson said IBM has two steadfast rules: It never allows anything to come between it and its customers, and it never lets anything stand in the way of its future plans.

Anything that violates those two rules is often severely dealt with, Anderson said. He pointed to the third-party mainframe leasing business and the used printer markets as areas that have incurred IBM's wrath.

Communications Battle

The big threat of the '80s is communications, and, according to Anderson, IBM has its battle plans drawn.

Firms like Rolm Corp., Xerox and AT&T, who have long been in the voice communications and data transmission business, see their future in communications.

They also see that it is possible to process data while they transmit it — a service that could eliminate the need for in-house processors in many firms.

While the service bureau concept may not shake IBM's big users — who want tight control and security over their systems — the idea might strike a pleasing note with some smaller users, Anderson said.

For example, some users like the idea of sharing software — an easy task for a service bureau, since it can put all its software into the service and bill the customer for the packages used.

Other users may like the idea because they need more computing power but face tough conversions — for example, users of IBM's General Systems Division products who need to expand to a larger Data Processing Division system, Anderson said.

Superservice Bureau

IBM's plans to combat AT&T and Xerox with a "superservice bureau" using IBM's interest in Satellite Business Systems as a starting point for long-haul networking, and adding smaller facilities for short-haul communications, Anderson said.

But IBM's plan will appeal to a more diverse group of users than AT&T or Xerox. Anderson said the superservice bureau will fill in all the gaps between IBM systems, allowing some smaller users to get some big-system capabilities.

New hardware markets — particularly in the minicomputer range — pose another threat to IBM.

Anderson said that new suppliers like Citibank and American Express Co. see themselves as hardware and software suppliers to virtually every market.

Japanese Bid

Japanese vendors are expected to make a stronger bid to capture segments of the U.S. market.

And minicomputer vendors like Digital Equipment Corp., Wang Laboratories, Inc. and Hewlett-Packard Co. are posing a threat by selling their systems on the retail market.

The solution, Anderson said, is for IBM to expand its retail outlet venture.

While Anderson admitted "everyone in the computer store business is either losing money or making very little," the Yankee Group president said it is because computer vendors do not run their retail outlets as retailers.

If IBM would take a hint from major retail organizations and offer more aggressive sales techniques, remote diagnostics, a showroom and a larger processor in the back room to do some service bureau-type functions, the stores will be a success, Anderson said.

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WHEN PERFORMANCE IS CRITICAL,
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Exec Examines IBM's Strengths and Weaknesses

By Tom Henkel
CW Staff

NEW YORK — What are IBM's strengths and weaknesses? Yankee Group President Howard Anderson delivered his assessment of IBM's performance in various ventures at a recent conference here on "The Refocusing of IBM."

In the mainframe business, IBM is clearly No. 1. The firm has a 60% to 70% share of market, which Anderson calls "impregnable." Other American vendors like Burroughs Corp., Sperry Univace, NCR Corp., Honeywell, Inc., Control Data Corp., Digital Equipment Corp. and Japan, Inc. — including Fujitsu, Ltd., Hitachi Ltd. and to some extent Amdahl Corp. — all vie for second place, according to Anderson.

In the low-end mainframe market — what Anderson calls "midframes" — IBM holds a major share, but is somewhat vulnerable. Supermini vendors like DEC, with its VAX, Prime Computer Inc.'s 750 and Hewlett-Packard Co.'s 3000 and distributed data processing vendors like Datapoint Corp., Four-Phase Systems, Inc., Honeywell and DEC (with the PDP-11) are all knocking at the door.

Weak Spot

In the area of satellite processors, Anderson says IBM is quite vulnerable. Most minicomputer vendors including Datapoint, Wang Laboratories, Inc. Harris Corp., Nixdorf Computer Corp., DEC, Data General, Four-Phase and Computer Automation, Inc. along with the time-sharing industry, have a good chance of stealing IBM's No. 1 position, Anderson said.

In software, IBM dominates, but the market is not as impregnable as the mainframe market, Anderson said.

Large software houses such as Informatics, Inc., Applied Data Research, Cincom Systems, Inc., Cullinane Database Systems, Inc., Software AG of North America, Inc., Management Sciences America and Information Sciences, Inc. all have developed strong niches in the IBM-compatible software market.

IBM has been making its software more modular (an advantage) but not any cheaper (a disadvantage), Anderson said. But a new release of the IBM IMS data base management system may shore up the firm's position in the software market.

Time-sharing firms like Tymshare, Inc., NCSS, General Electric Co., Sun Information Services Co., ADP Network Services, Inc:, Service Bureau Corp., Compuserve Inc. and Infonet also compete for IBM's software market because those firms allow users to share software.

On the communications front, IBM is virtually dormant. The firm has a 42% interest in Satellite Business Systems (SBS) — which offers the potential for a long-haul networking service — but the IBM/SBS venture is in its infancy, Anderson said. Other communications vendors already have the means for large-scale data processing services in place, and all they have to do is expand their services. Firms like AT&T, MCI Telecommunications Corp., SPC, GTE Telenet Communications Corp., Tymnet, Inc. and Uninet all are expected to give IBM problems over the next few years.

IBM is also vulnerable when it comes to communications products. The firm is expected to announce an enhanced version of its 3705 communications controller in the first half of 1981, but until then, plug-compatible manufacturers (PCM) like Comten, Inc., Paradyne Corp., Codex Corp. and Hazeltine Corp. have somewhat of an upper hand, Anderson said.

IBM is still strong when it comes to office automation, but firms like Wang, Xerox, Datapoint, AT&T, Sears Roebuck Co, DEC and the Japanese vendors have created some serious problems for IBM in recent months. But IBM is making a comeback, Anderson said, with its Displaywriter along with the 5520 and 3730.

IBM dominates the storage field, but supply constraints have allowed PCMs like Storage Technology Corp. and Memorex Corp., along with the Japanese vendors, to make some inroads into the market, according to Anderson.

IBM also dominates in peripherals — and stands to become even more dominant. Anderson said IBM's decision to consolidate peripheral production efforts, and rumors of IBM offering seven-year peripheral leases, may strengthen the firm's position against

(Continued on Page 16)

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NBS' Optimism Increases Over I/O Standards

I/O Interface Update

By Jake Kirchner
CW Washington Bureau

WASHINGTON, D.C. — When the federal government adopted four I/O interface standards last year, the National Bureau of Standards (NBS) predicted their use would produce government savings of approximately $60 million over five years. Now, NBS says, the savings may be even greater.

The bureau's optimism is based in part on its own experience in using the standard interface to combine the mainframe and peripherals of several vendors in a single system, according to Thomas Pyke Jr. of the NBS Institute for Computer Sciences and Technology (ICST).

Using commercially available interface adapter hardware and software that brings out the standard interface on an ICST Digital Equipment Corp. PDP-10 mainframe, ICST was able to save over $100,000 in procuring 1.2G bytes of disk storage, he said.

Because the adapter gear, supplied by Systems Concepts Inc., makes the DEC mainframe conform to the standards, which are based on IBM 360 or 370 architecture, ICST was able to undertake a competitive procurement with vendors of IBM plug-compatible disk drives and controllers.

Without the adapter, ICST, like all users, would have had to settle for standard DEC peripherals. Using a competitive procurement, however, ICST contracted with the low bidder, Control Data Corp., for a CDC 33502 dual-spindle disk drive and a CDC 38302 controller at a combined cost of $74,224.

Comparable DEC equipment, at the government's discount price, would include a DF10 channel, an RF10 single-channel controller and six RP06 drives at a cost of $258,904. By procuring the CDC equipment using the $57,500 channel adapter, the net savings were $127,180.

Pyke, who is director of the ICST Center for Computer Systems Engineering, said the institute also estimates savings in energy consumption of over $5,000/year and in equipment maintenance of over $8,000/year. In addition, the CDC equipment requires only half the floor space the DEC hardware would have, he said.

Using the same adapter equipment, ICST also saved money in acquiring a Storage Technology Corp. tape subsystem, he said. But at least as important as the savings was the fact the institute was able to buy equipment of newer technology and higher performance than the DEC peripherals.

Commenting on the procurements, Pyke said "we don't think this is atypical of what is starting to become possible now for agencies by stimulating availability of equipment that conforms to the standards."

He noted the Systems Concepts adapter hardware and software are off-the-shelf and have been delivered to over 100 government and private-sector customers.

The ICST experience with commercial adapter technology, Pyke said, leads him to believe the I/O standards are going "to really reap substantial benefits."

Burroughs Joins NBS Fold

(Continued from Page 1)

under way on I/O interface standards for IBM 3370- and 3380-type disks.

NBS is also currently working with the American National Standards Institute Ansi to develop a "forward looking interface" standard, based on high-speed bit, serial bus architecture, he added.

This future standard, which could be adopted for federal use in 1984, will allow agencies to be prepared for advanced architecture designs expected in the mid-to late-1980s, he said.

Private Sector Benefits

While the focus of the NBS effort to promote development and use of adapter technology is to make the interface standards work in the government agencies, there are possible benefits for private-sector DP users as well.

Considerable economies could be realized for all systems if widespread availability of adapter hardware and software make a mix-and-match procurement approach possible for equipment acquisitions from the major mainframers. According to Pyke, there is evidence of a trend in that direction.

He noted the Dynamic Sciences' Burroughs adapter has been available for tape and disk systems conforming to the IBM-derived standard for some time. Also, he said, Control Data Corp. has a contract with the Commerce Department to deliver a system that includes an I/O interface adapter to allow CDC Cyber 170 series mainframes to accept IBM-type tape and disk systems.

In addition, ICST, practicing what it preaches, has engineered a Digital Equipment Corp. system that uses third-party adapter gear to allow connection with CDC disk drives and Storage Technology Corp. tape subsystem.

The DEC system, used for NBS standards testing and validation programs, was put together with impressive savings over what comparable memory capacity would have cost if purchased from DEC, Pyke said.

He noted that without the adapter hardware and software, supplied by Systems Concepts, Inc., San Francisco, the ICST would have had to buy DEC peripherals at higher prices [see accompanying story].

Mainframers' Opposition

One sidelight of the NBS adaptor technology program is what it says about the current suit by CDC, Burroughs, Honeywell and Sperry Univac against the government's adoption of the interface standards.

The four companies argue that developing adapter technology to bring their mainframes into conformance with the standards would take several years and millions of dollars. The suit, which seeks to overturn the standards, is presently tied up in federal court here.

Although availability of adapters from third-party sources would seem to contradict the companies' arguments — particularly so if CDC, one of the plaintiffs, is able to deliver an adapter for its Commerce Department contract — the four firms also contend using the adapters will degrade the performance of their hardware.

Representative of that contention was a court statement by Edward Lohse, director of planning for Burroughs' Federal and Special Systems Group, that "even after expending the time and funds necessary to conform Burroughs products to the proposed standards, however, the use of such adapters . . . would result in a significant degradation of performance."

Pyke, however, said that having evaluated the effectiveness of the DEC adaptor in use at ICST there is no indication of system degradation. In fact, he said, "We have a number of indications that there can be performance improvements."

To the argument that the interface standards lock government users into systems architecture that may become obsolete, Pyke pointed to the bureau's commitment to refine the standards as necessary and its work with Ansi to develop a standard based on the best guess for future architecture.

He also noted that the latest IBM mainframe and peripheral announcements have shown the present standards will be effective for some time, at least until the next generation of hardware.

References furnished upon request.

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B-3-9-1

Trends in Young Industry

Interface Firms a Mixed Bag for Limited Mart

By Tom Henkel
CW Staff

The I/O channel interface industry is young — even by computer industry standards. Of a handful of vendors offering some type of channel interface, those in the market three to four years are considered old-timers.

Consistency is not a characteristic of these firms. They seem to offer a mixed bag of services that usually appeal to a very limited audience — one or two types of mainframe users.

Nevertheless, some trends have developed. Most vendors prefer to sell full tape or disk subsystems — as opposed to some type of black box that allows an IBM plug-compatible peripherals to run on another vendor's mainframe.

Some reluctantly offer the black-box type of product, but they do not brag about it. As one vendor admitted, there is more money in selling full tape and disk subsystems. And when the vendors sell only the channel interface, they wind up spending as much time installing it as they would a full subsystem — at a fraction of the profit.

Storage Technology Corp. (STC) disk and tape drives tend to be the preferred type of hardware among the channel-adapter vendors. These vendors say STC hardware is as good, if not better, and cheaper than its IBM counterpart.

Building a channel interface is only half the battle. The interface fools the IBM-type hardware into believing it is dealing with an IBM-type CPU, but to really use IBM-type disk or tape drives, the user must come up with software that makes Digital Equipment Corp., Univac or Burroughs Corp. data look like IBM data.

Most intelligent channel adapters come with software to make data transfer between unlike hardware transparent. Some channel adapter vendors, however, leave the software interface up to the user or sell it as a separate product, according to a spokesman from Jaguar Computer Systems, a Riverside, Calif.-based consulting firm.

There seem to be three basic markets for channel adapters: users of Sperry Univac's 1100 line, Burroughs B2700 and above line and DEC's PDP-11 and VAX-11 systems.

Some minicomputer vendors, like Datapoint Corp., sell channel interfaces that will hook their own systems with the IBM 370 software-compatible line. A Datapoint spokesman said his firm has interfaces to attach any Datapoint system, or any Datashare or Attached Resource Computer (ARC) network user to the multiplex channel on IBM's 360, 370, 4300 and 30 series systems.

Systems Concepts, Inc., a San Francisco-based firm, offers channel adapters that connect DEC PDP-11 minicomputers to IBM's 370 software line, Burrough's B6700 up to the B7700, Control Data Corp.'s 6600 and 7600 processors and Honeywell Inc.'s 6000 line.

Interscience Systems, Inc., a Van Nuys, Calif.-based firm, offers tape and disk subsystems for the Univac 1100/CW Staff 60 and 1100/80 mainframes. The firm sells mainly tape and disk subsystems, but it will sell a channel adapter only for $50,000. A spokesman said no one has asked for only the adapter.

Austron, Inc., in Austin, Texas, offers a sort of reverse channel adapter. That firm sells a DEC LSI-11-based programmable interface that allows IBM users to attach virtually any graphics system to an IBM CPU. All the user needs is a software interface, available from the firm in most cases.

Mainframes, such as Honeywell, IBM, CDC and Burroughs, do not offer channel adapters, spokesmen from those firms said.

Why Go to Trouble of Interfaces?

I/O Interface Update

Why should the user of a non-IBM mainframe go to all the trouble of attaching IBM peripherals to its system?

Because they're more advanced, industry analysts say.

That means that every time IBM announces a new disk or tape drive for its systems, manufacturers of plug-compatible peripherals rush to come up with a piece of equipment that is faster and cheaper. The result is a technology benefit for IBM users.

But users of non-IBM machines don't have the same opportunity — makers of peripherals compatible with non-IBM mainframes are scarce. And, as one channel adapter vendor noted, the other mainframe vendors themselves lag behind IBM and its competitors when it comes to making peripherals.

Moreover, the other vendors' offering are generally more expensive on a price/performance basis.

It's not surprising, then, the channel adapter vendors point out, that users of non-IBM mainframes want to cash in on IBM technology.

IBM-type peripherals tend to hold their value better than those from other vendors. The expense involved in buying a channel adapter to fit IBM peripherals to a non-IBM mainframe can be recouped on the used hardware market, one channel adapter vendor — Jaguar Computer Systems, Inc. — said.

But even with the advanced technology and higher residual values associated with IBM-type peripherals, those peripherals won't work as well on a non-IBM system as they do on an IBM CPU. Transfer rates will be generally slower, but Jaguar said most non-IBM CPU users don't care, the performance of the IBM-type peripherals — even degraded — is usually higher than the same peripheral from the OEM.

There is another advantage too. Large data bases generally require large computer systems, like IBM's 3033. But if a user with a much smaller system, a DEC PDP-11 for example, could access the 3033's tape and disk drives, the smaller system could pick up some big-system capabilities. That is particularly advantageous for large companies with a big IBM mainframe at a central site and smaller non-IBM systems at remote locations, one channel adapter vendor noted.

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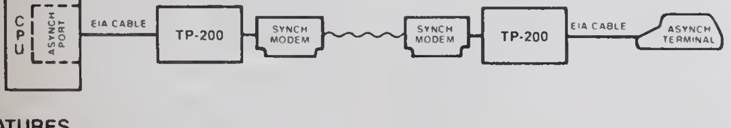

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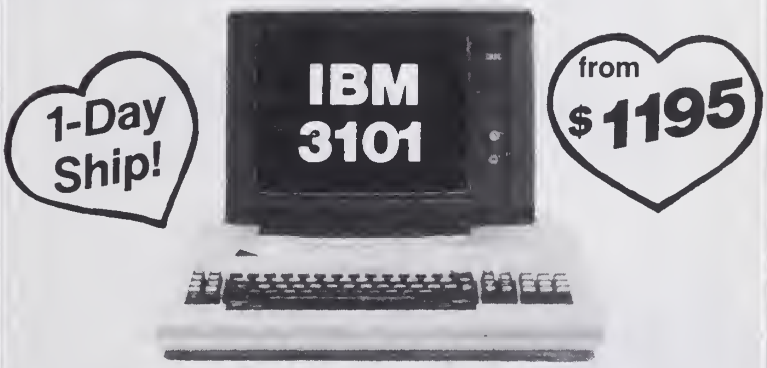

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Primary Arguments Economic

Congress Pushing to Delay 'Zip-Plus-Four'

By Jake Kirchner
CW Washington Bureau

WASHINGTON, D.C. — Taking up where the last Congress left off in December, the House of Representatives and Senate are bringing new pressure to bear on the U.S. Postal Service (USPS) to delay or abandon its controversial nine-digit Zip-Code plan.

Hearings on both sides of Capitol Hill have provided a forum for increasing congressional opposition to the "Zip-plus-four" program, as it is called by USPS. Several pieces of legislation to stop implementation of the new Zips have been introduced in both houses.

Bowing to earlier congressional pressure, the Zip Code expansion program has been delayed until June, at which time computer tapes containing the new codes will be made available to business mailers so they can begin converting their address files to the longer numbers.

Although congressional opponents of the postal automation plan point to constituent outcries about potentially burdensome Zip Code requirements, it is clear the primary arguments for and against the program are economic.

Doomed for Failure?

Addressing a recent Senate subcommittee hearing on the subject, Sen. Howell Heflin (D-Ala.) estimates the new codes will cost the public $1 billion to implement and an additional $1 billion for new USPS optical reading and sorting equipment.

Because the success of the new codes depends on public acceptance, the plan is doomed to be a costly failure, according to Heflin and his Senate and House colleagues fighting the plan.

'USPS hopes to save approximately $500 million in labor costs through the new codes, but admits the figures are a best guess, dependent on widespread public acceptance and timely acquisition of the new sorting equipment.'

Although the Postal Service agrees the new codes must gain public acceptance or fail, Postmaster General William F. Bolger, appearing at the Senate hearing Feb. 24, laid out in stark terms the economic consequences of not increasing postal automation.

As part of the new administration's efforts to cut federal spending, Bolger said, "it has been proposed that a quarter of a billion dollars already appropriated to the Postal Service for Fiscal Year 1981 be rescinded and that the public service subsidy be further reduced by a total of $746 million in Fiscal Years '82 and '83 and entirely eliminated in 1984."

On top of that, the independent Postal Rate Commission has reduced to 3 cents a USPS request for a 5-cent first class mail-rate hike. The Postal Service had counted on the higher rate to off set postal costs that are sure to rise as the service begins critical labor contract negotiations with postal unions later this year.

Because labor costs account for 86% of postal costs, the only way to economize is to increase postal-worker productivity through automation, according to Bolger and fellow backers of the Zip-plus-four proposal.

USPS hopes to save approximately $500 million in labor costs through the new codes, but admits the figures are a best guess, dependent on widespread public acceptance and timely acquisition of the new sorting equipment. Congressional opponents of the expanded Zips view the prospects for those two developments with some skepticism.

Sen. Dave Durenberger (R-Minn.) recently suggested USPS would need "divine intervention" to reach its goals. Durenberger called the new, longer codes "a mnemonic plague of contagious digititous."

In a more sedate argument, Rep. Ted Weiss (D-N.Y.) said last month in introducing legislation to ban USPS use of appropriated funds for the longer Zip Codes that "public acceptance of the current five-digit system was anything but immediate . . . and the equipment to be deployed is simply not available and, as the Postmaster General admits, will not be available for some time."

The outcome of congressional attempts to stop implementation of the new codes is anything but predictable, however. Despite widespread support, efforts to delay or stop the program have so far not resulted in final legislation specifically denying the Postal Service the authority to begin implementation.

For its part, the Postal Service is hoping rate incentives for business mailers to use the new codes will persuade a large segment of the mass-mailing community to begin converting to the nine-digit numbers. The incentive plan was scheduled to be presented to the USPS Board of Governors last week.

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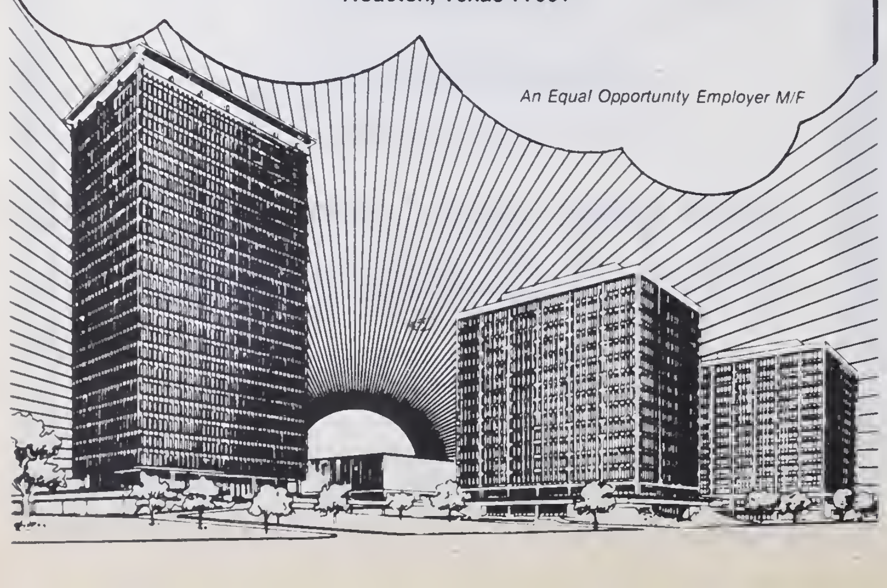

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Exec Eyes IBM Performance

(Continued from Page 13)

competitors like Courier Terminal Systems, Inc., Raytheon Data Systems Co., Documation/Storage Technology Corp., Control Data Corp., Plessey Peripheral Systems, Inc., Memorex and the Japanese vendors.

When it comes to maintenance, IBM is strong. AT&T has the potential to break into the maintenance and service field, along with some other mainframe and minicomputer vendors, but if IBM can cut maintenance costs through remote diagnostics, it will remain on top, Anderson said.

Retail Sales

When it comes to new ways of selling computers, IBM is vulnerable. Anderson said firms that have already developed large retail outlets — Radio Shack Corp., Sears and Xerox — as well as firms that have made a strong commitment to do so, like DEC and CDC, will be ahead of the game — although Anderson admits retail outlets have shown less than exciting results so far. IBM has already opened two retail outlets (in Philadelphia and Baltimore), and the firm said it will open more in the future.

IBM has also made a strong showing by selling its Series/1 processor on the OEM market. That market may also prove profitable, Anderson said.

Service Bureaus

When it comes to service bureaus, IBM is dormant. Firms like CDC, NCSS, Tymshare, AT&T, General Electric, ADP, EDS Nuclear, Inc., Compuserve, Boeing Computer Services, Inc., McAuto System and Sun Information all lead IBM in the market.

However, Anderson predicts IBM will launch a "Superservice Bureau" in 1983 through its General Systems Division that will offer some heavy competition in the market.

Technology is perhaps the most important area where IBM could excel — and it certainly does. When it comes to semiconductors and state-of-the-art electronics, IBM surpasses everyone, Anderson said.

Firms like Intel Corp., National Semiconductor Corp., Motorola, Inc. and Mostek Corp. have made strong showings in the semiconductor market, but none can match IBM's R&D, Anderson noted.

Initial Industry Response Favorable to Reagan's Plan For Accelerated Depreciation

By Lois Paul
CW Staff

"It's not an earthshaking change, but it's positive" was the common reaction within the DP industry to President Reagan's proposal authorizing faster depreciation of equipment investments and simplifying the capital-cost recovery system.

For potential buyers of computer equipment, the new rules would generate faster tax deductions, leaving them with more cash with which to purchase additional or upgraded equipment. Another plus for end users is that the expected useful life of an asset, such as a new computer system, will no longer be a consideration.

Currently, most business equipment, including computer equipment, is written off over a period of between seven and 12 years. Under the Reagan proposal, the cost of nearly all machinery and equipment will be deductible over five years by 1985, when the program is expected to be in full swing.

Larger benefits from write-offs will come in early years. Twenty percent of the cost will be written off in the first year, followed by 32%, 24%, 16% and 8% in succeeding years. Companies that write off equipment in five years may also qualify for a 10% tax credit on their investment, rather than the current 3.3% credit.

"The intent is to get people to invest capital in equipment," said Gary Locarno, tax manager for Deloitte, Haskins and Sells in Boston. "If the changes come through, in the computer field this may help people decide it is better to acquire equipment," he explained.

According to Bill Easterbrook, a financial analyst with Kidder, Peabody and Co. in New York, the effect of the changes will be either a slight positive or a slight negative, depending upon the companies' current methods of depreciating computer equipment.

"Some companies like NCR Corp. and Honeywell, Inc. do depreciate for tax purposes at rates of five years or more, depending on the piece of equipment. It will have a modest cash flow benefit for them if they are forced by this proposed new ruling to go to five years.

"If companies depreciate for tax purposes at rates faster than five years, it will work out to be a slight negative for them, in terms of cash flow," he added.

Buy vs. Lease

"The net result is probably a modest positive for the industry as a whole," Easterbrook said. He also felt the changes will tend to increase sales of computer equipment, at the expense of the leasing industry.

Jim Benton, executive director of the Computer Dealers and Lessors Association in Washington, D.C., disagreed with this view, noting, "Anything that encourages the purchase of equipment helps us.

"The user pays less because there is a tax advantage in buying and it doesn't matter if we buy it or whether he buys it. We can pass that savings along right directly to him, as if he'd done it himself," he said.

A Boston-area lawyer who specializes in computer legal matters, Robert Bigelow, felt the proposed changes will not affect the buying vs. leasing decision. He said the proposed accelerated depreciation will be particularly helpful regarding the use of computers designed for specific projects, such as retail systems (point-of-sale terminals), legal research or medical laboratory equipment, for which the IRS requires longer depreciation.

Jeff Griffey, DP manager of Midlantic Banks in Orange, N.J., said being able to write off equipment in shorter amounts of time makes "practical financial sense," particularly with regard to the computer industry in which technological changes occur so rapidly. He said, "There may be a slight tendency to make more purchases," but suggested that this always is based on many other factors.

According to William F. Zachman, research director for International Data Corp.'s Information Systems Planning Service in Massachusetts, the proposal "couldn't come at a better time for the information processing industry." He cited the need within the next few years for a "move into a new hardware and software technology across the industry." The changes, he said, "will help pave the way toward new technology."

Robert Coyer, vice-president of Computer and Business Equipment Manufacturers Association in Washington, D.C., said, "Generally, we favor something that would accelerate depreciation. However, I don't think it is going to condition a great deal, one way or the other, the lease vs. buy decision."

This decision will be influenced instead by interest rates, the availability of money and the type of application, Coyer said. "Those with a fairly stable application may be in a position to buy rather than lease, but those with very volatile applications probably will opt for leasing."

Coyer said, "The proposal is a significant change in tax policy, but I don't think it will make much difference in the way people acquire computers."

Ken Pontikes, president of Comdisco, Inc., a leasing company in Chicago, agreed with this description. "I don't look at it as a big reaction. It just changes the parameters."

According to Svend Hartmann, president of Computer Merchants, Inc. in Chappaqua, N.Y., which is a vendor of new and used IBM equipment, "The change is not nearly as drastic as it would be in other industries with more permanent investments."

He said the major advantage of the new plan is that it simplifies matters. "You don't have to worry so much about the life of equipment. It is a simple five-year rule." Hartmann added, "I don't see it as a tremendous influence to buy."

Jim Feeney, the treasurer of Devoe and Reynolds, a division of Grow Group, Inc. in Louisville, Ky., also felt that the proposed tax benefits will not

(Continued on Page 18)

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Eighty Authorities Assemble

DPMA Curriculum Study Enters Final Phase

By Jeffry Beeler
CW West Coast Bureau

POMONA, Calif. — A committee of the Data Processing Management Association (DPMA) has assembled some 80 nationally recognized computing authorities to produce a detailed outline of a proposed model curriculum for undergraduate information-systems instruction.

The authorities, who are divided into roughly a dozen four- to eight-member work groups, have launched a new phase in a curriculum development project that originated at California State Polytechnic University here in 1979.

Sponsored by the DPMA's Education Foundation, the project is aimed at developing a nationwide course of study that will prepare college- and junior college-level students for careers as business application programmers and systems analysts.

During the last 18 months or so, hundreds of computing specialists from throughout the U.S. have worked together to sketch the model curriculum's broad framework, according to Dr. Thomas Athey, chairman of the project's executive committee. The results of that cooperative effort are summarized in a one-page outline that calls for a sequence of seven required or "core" courses and three elective courses.

With its overall structure now firmly established, the model curriculum is undergoing review by more than 80 so-called "course-team experts," who seek to expand the original one-page outline to as many as three to five pages. In essence, the experts aim to flesh out the proposed curriculum's broad framework by adding specific details such as course descriptions, course objectives, course prerequisites and listings of recommended reference materials, including textbooks and audio-visual aids.

Athey, who also serves as chairman of Cal Poly's Information Systems Department, describes the "course-team expert" approach as the third in a three-pronged curriculum development effort. The first prong came early last year when educators and computing specialists from throughout the U.S. gathered at the Cal Poly campus to lay the model curriculum's preliminary groundwork (CW, March 31, 1980).

Second Prong

The second prong began last October with the first in a series of one-day regional workshops designed to subject the proposed course of study to further scrutiny and revision. Now, the curriculum development project's third prong has been set in motion with the recruitment of the course-team experts, who are scheduled to complete their work shortly before mid-March when the final two regional workshops will take place in Toronto and Washington, D.C.

After being reviewed by the participants in the last two workshops, the course-team expert's recommendations will go to Athey's executive committee, which will critique the work and return it to the authorities for final revision. The model curriculum's finished version is slated to be shown publicly for the first time at the National Computer Conference in early May, Athey said.

Drawn from practically every major U.S. geographical region, the course-team experts form a broad cross section of computing specialists representing both industry and the academic world. On the industry side, the experts include professionals like management information systems vice-presidents, information resource managers, data base administrators and programmer/analysts.

"We're trying to get the model curriculum examined by people who are actually practicing business data processing out there in the field," Athey said. "But at the same time, we want to tap the expertise of college folks who can translate the outline topics into what's teachable and how much can be taught in a single semester."

Response Positive To Reagan's Plan

(Continued from Page 17)

enter into the basic decision for companies to buy rather than lease computer equipment.

"We are reluctant to tie up many dollars in equipment that might be obsolete in three to five years," he commented.

Feeney said he could see an advantage for users of manufacturing process equipment and for process-type industries to use this opportunity to upgrade their equipment.

"The changes would have to be motivation for purchase," Jerry Bull, president of Honeywell Large Systems Users Association in Baltimore, said. "It would be a cost justification for replacing equipment earlier in its lifecycle," he added, noting, "If it shortens the depreciation period, it gets it off our current year appreciation so funds are now available for new purchases."

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Technicians vs. Managers Seen Posing Dilemma

By Ann Dooley
CW Staff

PHOENIX — Computer technicians vs. business managers; computer business managers vs. managerial technicians.

Round and round it went at the recent 1981 Conference on EDP Performance Management sponsored by Applied Computer Research, Inc. and Performance Management Association, both from the Phoenix area. The dilemma concerning management and computer professionals was a continual question mark threading through the conference sessions and the informal discussions of the 150 computer managers attending the recent conference.

The attendees all seemed to agree that a programmer productivity problem existed, but they were more certain of what was hampering productivity than what could be done to ease the problem.

CW at
Performance
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Increasing productivity is an ever-present part of the job, most of the gathering admitted. One Minneapolis manager revealed that productivity increased at his shop by allowing the staff to take terminals home. George Simon, operations director at Montreal's Canadian Pacific Ltd. claimed to have achieved 99.4% end-user availability, but attributed it primarily to a lot of hard work and organization.

Finger Pointing

But it was top management that attendees most frequently pointed a finger at in assessing blame. Many felt that top management was not committed to helping the company evolve through the use of the MIS function, either because they did not understand its potential or because they simply were hesitant to implement change.

Again and again the managers complained that their top management did not react until something turned into a problem. Some even doubted whether their executives understood the help that DP could be in turning around productivity on a corporatewide basis.

Paul Robichaux, vice-president at Boole & Babbage, Inc., noted that, "executives are aware of what DP can do, but many only pay attention to the bottom line.

"But numbers are becoming secondary and people are most important now," he added.

Expert Panel

The managers at the conference indicated that capacity planning and performance management would be an important trend for them in the '80s. A panel of experts consisting of Carl Reynolds, director of telecommunications and DP at Hughes Aircraft Co., Los Angeles; Al Crawford, internal information services manager at Digital Equipment Corp., Maynard, Mass.; and Dan Tubbs, DP director for Iowa Electric Light and Power, Cedar Rapids, Iowa, seconded the thoughts of the attendees.

According to Reynolds, productivity has to be measurable, but measuring methods will have to become more efficient, he noted. Most of what needs to be measured is intangible and unobservable.

Regarding the business/technician problem, Reynolds noted, "It's the eternal problem in all professions; technicians who don't understand the business."

Crawford agreed, noting that staff members are promoted for their expertise, but that when they get to management level, they have no business experience.

Computer technicians need to understand business before new software tools are made available, one session participant stated.

To integrate DP with business, "we must prove we can be top managers or we will remain considered to be service people and that's all," Crawford warned.

"There's a crying need for training and ways to improve productivity," he maintained.

"But it's important to remember there's nothing wrong with being a technician or a manager, except when you're a technician in a management job," he noted.

Corrections

D.B. Systems, Inc. was incorrectly referred to as Data Base Consultants and Designers [CW, Feb. 9]. Its address is 2 S. Patton Ave., Arlington Heights, Ill. 60005.

The Fifth International Conference on Computers and the Humanities is scheduled for May 17-20 in Ann Arbor, Mich., not March [CW, Feb. 9]. Details are available from Prof. R.W. Bailey, English Department, University of Michigan, Ann Arbor, Mich. 48109.

The Third International Conference on Data Bases in the Humanities and Social Sciences will take place May 20-23, not in March, [CW, Feb. 9]. Details are available from G.A. Marks, Institute for Social Research, University of Michigan, Ann Arbor, Mich. 48109.

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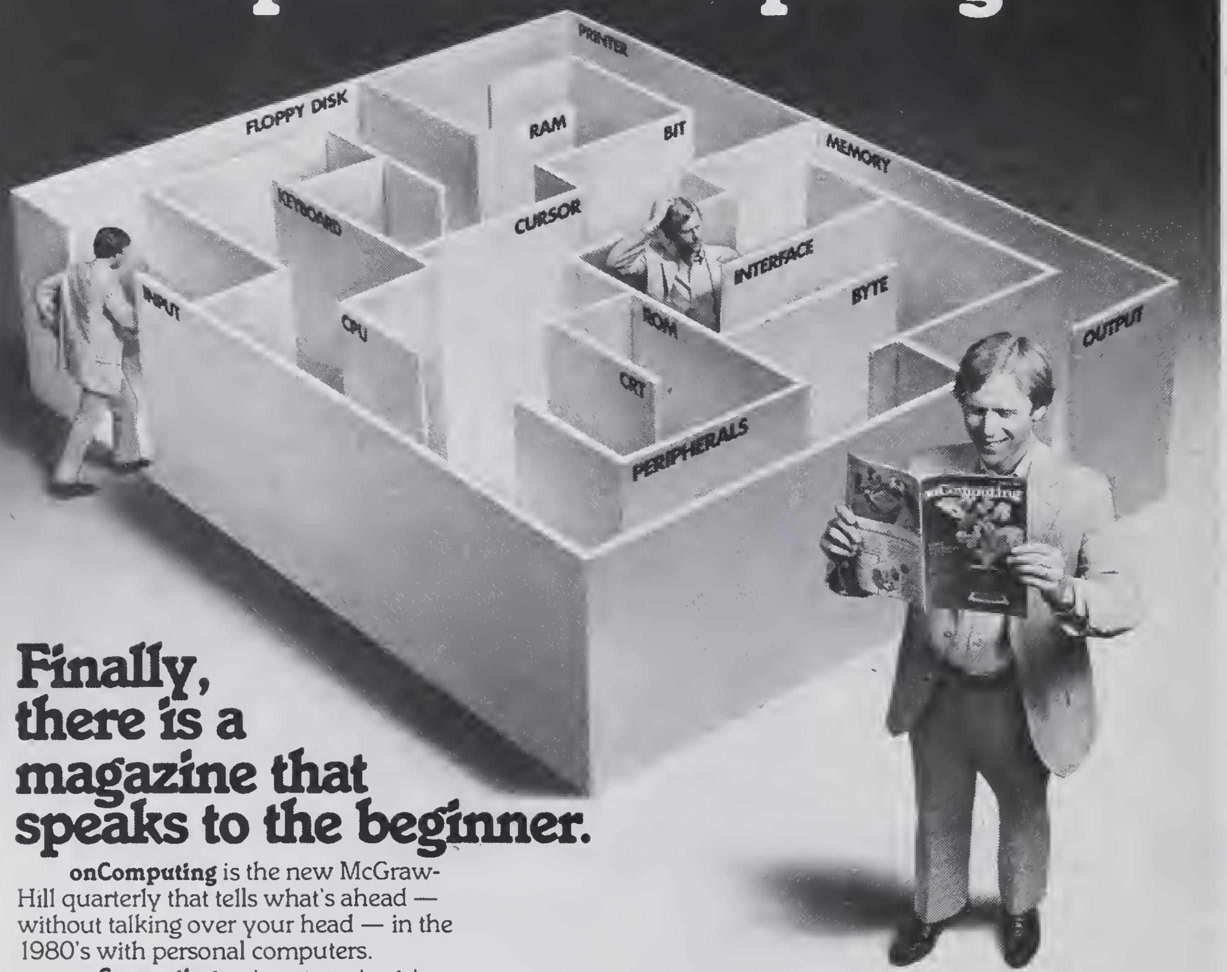

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People the Biggest Barriers

MIS Managers Called Key to Making Changes

By Ann Dooley
CW Staff

PHOENIX — MIS managers ultimately hold the key to successfully implementing changes within their installations and the corporate environment. People are the biggest barrier to implementing change, and whether they welcome it or resist it depends on how management presents it, attendees at the 1981 Conference on EDP Performance Management were told here recently.

Change is the most mismanaged aspect of an organization, Jack Stanton, state automation director for the Arizona Department of Administration, told attendees. A manager has very little control over most changes that affect his installation, but when a change does occur, he should try to make it as acceptable as possible for his staff, he noted.

Calling DP a delivery service business, Stanton said that changes within the end-user environment continually cause resulting changes in the DP system components. A manager should always allocate some resources to allow for these contingencies, he told the audience. Factors influencing these unforseen changes can range from user application evolution to governmental actions to the economy to "human nature" conflicts, Stanton said.

And the evolving nature of the computer industry, itself, is creating changes, Stanton noted.

The role and scope of DP management and the industry as a whole is being broadened and enlarged. Computer professionals are facing for the first time a major change in the scope of computer-based automation, according to Stanton, who sees DP evolving into a subset of the broader administrative design and manufacturing applications of computers. It is unclear as yet exactly to where DP will gravitate, but it will no longer focus on the DP center function, he said,

Operations Plan

Robert Abrams, computer executive at Nolan Norton & Co., Lexington, Mass., outlined a performance management program for the attendees. A performance management system will indicate which aspects should be emphasized in gaining improved performance, according to Abrams. It defines who the change participants are and what their roles will be, he noted.

A DP organization must determine in its operation plan which applications will be developed and maintained, what product services will be offered and what internal infrastructure-building efforts will need to be undertaken.

In addition to showing how to execute changes and providing a means of coping with changes, an operations plan will improve staff morale, improve communication with users, senior management and staff, change work habits, introduce accountability, increase staff commitment and reduce role conflicts, Abrams said.

In developing an operations plan, a manager has to address what actions are going to be taken, what resources — including people, hardware and software — will be utilized and what the cost will be.

Abrams defined performance management as an organized approach to identifying and measuring key aspects of DP activity to improve the quality of information and increase understanding. Most organizations as yet do not conduct performance reporting as a formal objective, he noted, but more will begin doing so out of the growing need to increase productivity.

But Abrams also cautioned the audience that some problems exist when implementing a performance plan. Implementation usually takes longer than expected and requires significant resources, and the evolution to a functioning program takes time and resources even after start-up, he noted. In addition, resistance and frustration are certain to occur during the implementation stage, he noted.

CW at
Performance
Management '81

What is more, not everyone wants to be measured, and performance reporting often "rattles some cages," Abrams said.

Abrams admitted that measurement is still a difficult feat. If quantity measurement techniques are implemented — quantity alone will usually rise and the same will happen with quality measurement techniques. It is hard to have both, he noted. If only one thing is measured, that is the only aspect that will get done, he said. To avoid this, Abrams suggested that managers must implement a series of interrelated measurements.

Employees' expectations will be more favorable to change if support is given and directed by top management, according to Abrams.

Abrams suggested that when implementing a performance plan, managers should establish monthly operating

(Continued on Page 22)

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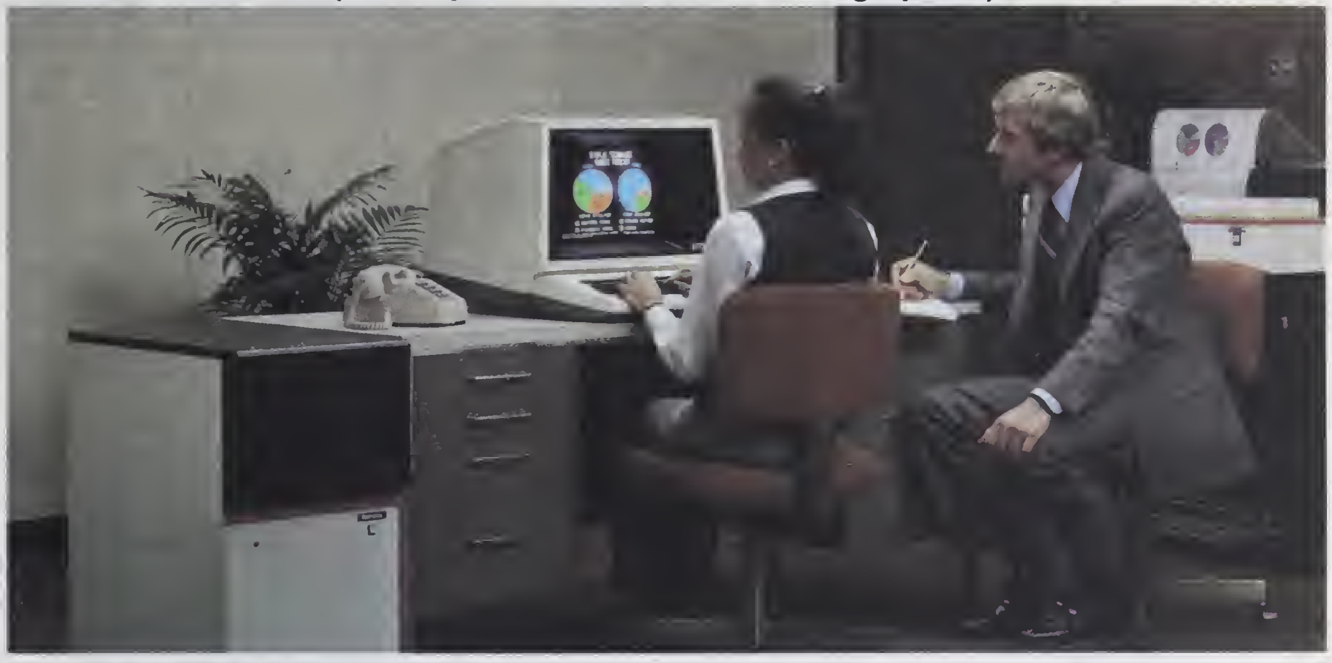

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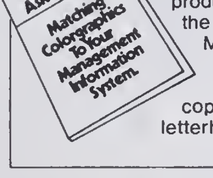
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'Buy Only Enough' Held Secret to Productivity

By Ann Dooley
CW Staff

CW at Performance Management '81

PHOENIX – One secret to improving productivity is to "buy only enough" of your DP needs, according to Barry Stevens, principal consultant for Performance Management Associates, a consulting firm here.

Advising attendees about production management at the 1981 conference on EDP Performance Management held here recently, Stevens also noted that a screening committee should be instituted to select the highest cost/benefit projects for long- and short-range planning. A manager should utilize measure and report indices, identify high time and cost work centers and work units and also systematically reduce the impact within service limits, Stevens told the group.

In order to measure productivity, managers must use effective cost accounting tools that will be clear and explainable to non-DP executives. According to Stevens, cost accounting will track all resources and determine where, when and how the resources are used.

Another benefit of the improved productivity methods is that all work becomes auditable so a manager can demonstrate the source of the work accomplished, he said. Stevens advised the group to break the work into work units and application units, charted by each month. Expense elements can be charted out each week for further control, he added. In this way, managers can determine the standard cost for each work center, each unit's standard cost and each application unit's cost, relating to productivity.

Key Elements

The key elements in establishing performance management practices, according to Stevens, are user interface, planning, development and operations. The specific size and technology are really not relevant since the key elements can be applied to almost any situation, he claimed.

When implementing performance management techniques, managers should define performance, institute tracking and reporting procedures, problem solving techniques and cost accounting and capacity planning methods. These measures should be implemented in addition to the management screening committee and the long- and short-range planning committees, Stevens noted.

To implement performance management, a manager should develop analysis procedures, internal program requirements, a user service agreement and an organized work plan.

Work Plan

The work plan should cover developing new projects, including maintenance, enhancement and problem solving; work functions; and operations, including what internal performance is needed, he stated.

Stevens cautioned the audience that if the objectives are incorrectly assigned, productivity loss can occur.

Successful performance management techniques will provide managers with improved communications between both the DP department and the user as well as the department and top management, Stevens noted. Other benefits will include an accountability that is clearly assigned, capacity planning on a departmentwide basis, overall productivity improvement and, frequently, simplification of procedures, Stevens noted.

Other measurable benefits that a manager can point to will include reduced problem resolution time as well as reduced budget preparation time. Administration overhead and forms will be reduced, people performance will be able to be documented and a production measurement plan can be created.

A manager will also be able to identify high impact tasks and justify improvement costs to his staff and to his employers, Stevens concluded.

Managers Said Key to Change

(Continued from Page 21)

committee meetings to decide who is going to do what, when, and where the resources will come from.

Audience Exception

Abrams' theory about performance management programs did not meet with unanimous approval from the audience. However, Donald Deese of the U.S. Air Force noted that such plans, in his experience, were expensive to implement, expensive to operate and "not fairly useful."

Deese also claimed that top management eventually loses interest in the program and drops support and possibly resources. Some managers don't ever take the time to understand the reports and therefore, never like or accept them, he also noted.

Deese told the group that if they are going to implement such a plan they should begin small and as a first step find out what the end users will need and use rather than developing the skills without a justified user for them.

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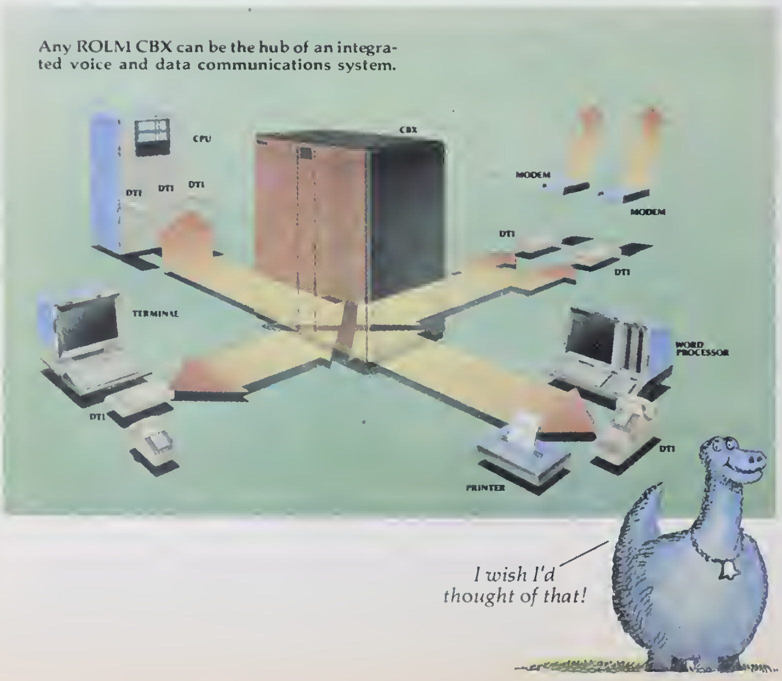

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Benefits Not Automatic

Exec Says Productivity Not Always Profitable

By Ann Dooley
CW Staff

CW at Performance Management

PHOENIX — Even though some managers might not like to believe it, increasing productivity will not automatically increase production or profitability.

When productivity increases, many managers expect production or profitability to increase as well, but it does not always happen, Carl Thor, vice-president of measurement at the American Productivity Center at Houston, said. An increase in production alone says nothing about what created the increase. Profitability, although closely related to productivity, includes the effects of inflation in both input and output and various extraneous effects, according to Thor.

Speaking at the 1981 Conference on DP Performance Management, Thor told the audience that in order to improve productivity at a computer installation, it is first necessary to be able to measure it. Productivity measurement involves awareness of productivity and an understanding of what it means. Once it is understood, a computer manager must determine where there may or may not be productivity progress taking place. Then there is a diagnosis or appraisal step that needs to be taken, Thor said.

Thor told the attendees to determine the policies and procedures of their companies and then sit back and make an arms-length review of the problems and opportunities that are found in the DP departments. Measurement results provide a major tool for this diagnosis, Thor noted. Once this procedure is completed, the computer manager must investigate and employ the appropriate improvement techniques, he said.

Significant Factors

Although many computer managers still use productivity ratios, such as lines of code per man-hour, this is only a partial productivity measure, according to Thor. There are other factors, such as capitol, energy and materials, that may be more significant than labor, he noted.

Some computer managers might try to measure productivity at the individual or group level, but it is difficult to extend to large groups, much less the division or company level, he told the group. Computer managers are finding it increasingly difficult to come up with proper measures to monitor output. When only one type of input and output are present, measurement can be simple, but this is rarely the case, Thor said.

Thor noted that most work on productivity in a staff environment in the past has concentrated on the productivity of the individual. Time monitoring is often used by the managers, but it does not necessarily have a direct relation to the successful completion of a project, Thor told the audience. An individual's output can be analyzed only if the output can be precisely described, and as work becomes less repetitive, the chances of using set performance standards to measure output become less likely, he added.

Thor advocated the use of the Nominal Group technique in productivity measurement. The technique employs a structured process for task analysis and involves group participation utilizing the specialized knowledge of the group. Additionally, the influence on their coworkers may help in ensuring acceptance of the improvement ideas or measurement system, Thor noted.

(Continued on Page 26)

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Development Seen Vital to Performance Control

CW at Performance Management

By Ann Dooley
CW Staff

PHOENIX — Before a performance management program can be successful, a sound development process must be implemented, according to Phil Howard, president of Applied Computer Research, Inc.

Although development projects may vary with each installation, certain criteria are common among them, managers at the 1981 Conference on Performance Management were told here recently.

A nationwide survey by Howard of user installations has indicated an average 33% of the total DP budget is allotted to the development staff. But even with the importance placed on development, 88% of the installations surveyed by Howard reported experiencing an increasing backlog of development time.

On the average, the DP staff in Howard's survey consisted of 21.2 programmers, 12.6 designer/analysts and 6.6 project leaders. Cobol was the most commonly used language followed by assembler, then RPG and Fortran. Only 22% of Howard's respondents utilized an application development package, but most commonly used were development management systems and automated design facilities.

Turnaround time for batch test shots was most frequently between one and two hours, according to the respondents, 92% of whom reportedly have interactive programming capability.

Structured programming was the most often used technique for improving programming, followed by top-down design, Howard's survey indicated.

Regarding management control, 75% reported using formalized project management to control development projects, but 72% had never purchased a project management package. DP installations were split nearly in half over whether to charge users for development — 44% approved, 56% did not. The survey also showed that 76% have purchased application software packages.

Also revealed by the survey was that 78% of the respondents had established standards for design and programming, 61% had set objectives for programmers, 73% did not test new hires for programming aptitude and 84% failed to capitalize development costs.

The respondents reported that 34% maintained a measurement data base implementing milestone checks most often, followed by hours/project and then reliability.

In an analysis of the development costs, the survey found that 36% was spent on analysis/design, with a similar figure going to programming and 28% allocated for test/integration.

(Continued on Page 26)

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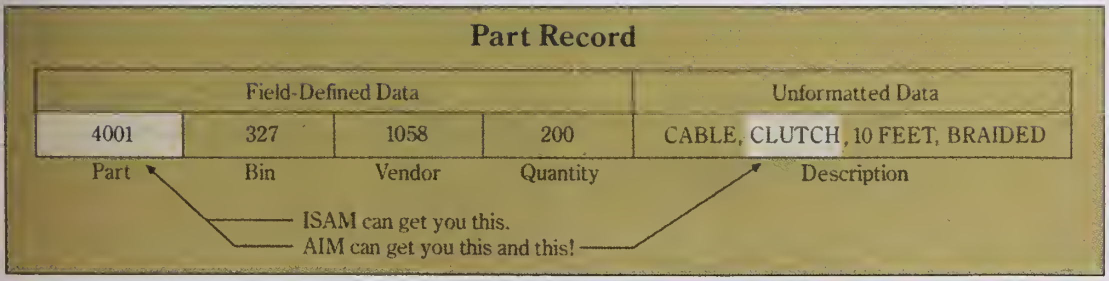

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Development Process Held Key to Management

(Continued from Page 24)

In the same session, conference attendees were also advised by Dan Rosenberg, senior consultant for Price Waterhouse Co. in Atlanta, to devote more time to the development process and streamline the maintenance and enhancement time to achieve more effective time and cost management.

Modularize Programs

Rosenberg recommended that managers modularize their programs and that libraries be used in developing source images to deliver more code as well as reduce enhancement costs. The modular use of libraries will support design methodology, promote thorough documentation and assist in maintenance/enhancement, Rosenberg told the assembled managers.

"Producing software is just like any other production process. It's frequently thought of by some as an art form, but it's not," Rosenberg asserted. Quality control should be used to improve the production process and prevent unsatisfactory output from reaching the users, he noted. To achieve these goals, managers should monitor the production process, sample interim results, inspect finished products and analyze user feedback, Rosenberg advised.

The standards developed by the managers should be cost-effective, developed in the "trenches" and should be updated and revised on an ongoing basis, he noted.

Fiscal restraints should be a primary part of any tailored quality control program, as should time frames, competition, personnel and hardware resources, user involvement and quality control resources, according to the Atlanta consultant.

In implementing these methods, managers must remember that programmers and analysts have a high opinion of their skills and therefore do best in a supportive and nonthreatening environment if change is going to be accepted.

In closing, Rosenberg told attendees that when designing a development plan, managers should examine current use of productivity techniques, examine user needs and develop productivity evaluation criteria and measurement procedures. Managers should also select a pilot project, develop plans, monitor and revise the project, evaluate successes and failures and finalize and install the appropriate methods, Rosenberg said.

Don't Expect Profits Hike, VP Warns

(Continued from Page 23)

The Nominal Group process identifies improvement or measurement ideas and also includes voting and ranking to obtain the group's overall opinion.

Managers who are considering implementing productivity improvements have to contend with numerous employee obstacles, Thor warned. Many employees, and even some managers, assume that productivity improvements represent a risk to their job security or at least an indication that they will have to work harder in the future.

Computer professionals believe — and with much justification — that their work is too unique to be evaluated by outside consultants. Much of the hostility has been generated from clumsy attempts to increase production — something that everyone in the industry will have to try to counterbalance, according to Thor.

Thor noted that Japan's techniques of quality circles has been very successful in voluntarily obtaining the participation of members in a given work place

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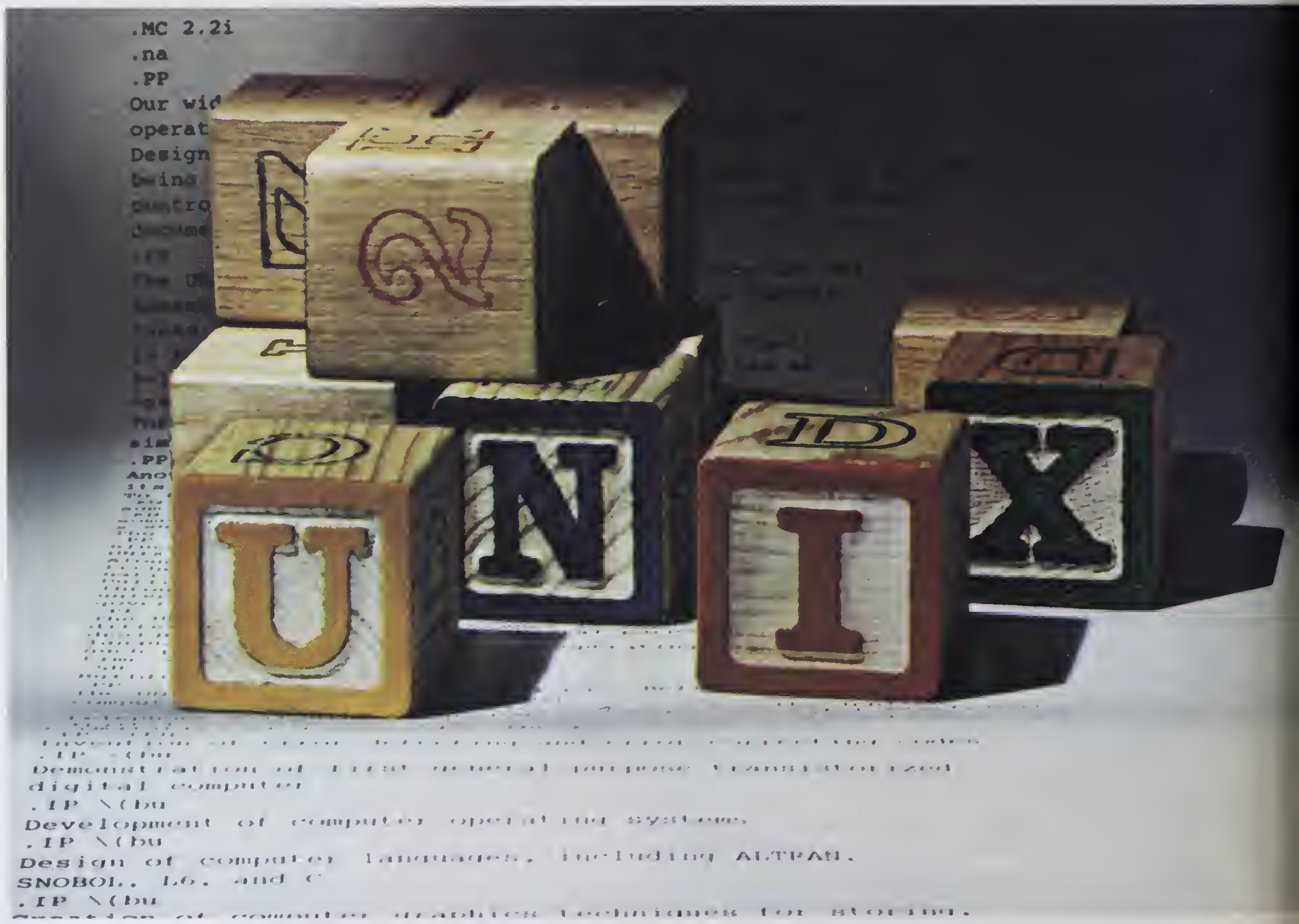

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The computer printout in the picture above contains the instructions and input needed for the *UNIX* system to format and produce the text on the opposite page.

From MIS Point of View

Executives Viewed Hindering Formal Planning

CW at Performance Management

By Ann Dooley
CW Staff

PHOENIX — Formalized planning procedures may be desirable from the corporate point of view, but they often place certain obstacles in the path of the management information systems (MIS) manager who must help carry them out.

Unwritten, incomplete or illogical marketing plans were one example that came under fire from Charles Hoerner, manager of systems development, management services, at Foremost-McKesson, Inc., San Francisco.

Hoerner told a group of managers at the recent 1981 Conference on EDP Performance Management that top executives frequently hinder formalized planning procedures. The group of DP managers laughingly agreed with Hoerner when he noted that some executives "who are coasting do not want a clear accounting of their procedures. Managers who manage by instinct or personality, or controllers who feel threatened by not having enough control may also impede planning procedures, he told the audience.

In working to implement changes, some DP managers might be faced with technicians who are too fixated on DP to implement business procedures or with top-level managers who are accustomed to informal planning. Both types will not be happy or committed to any proposed changes, according to Hoerner.

One more dilemma a DP manager must face in planning procedures is being asked for a long-range commitment when he can see only the short-term goals, Hoerner warned attendees.

Iowa Electric's Methods

Dan Tubbs, DP director at Iowa Electric Light & Power Co., agreed with the critical value of planning in a good working environment, but stated that many managers fail to realize this.

Describing Iowa Electric's DP planning methodology, Tubbs was more optimistic about the chances of implementing planning procedures, but told the group that a performance management plan is just the first step in implementing a complete performance management system.

The Iowa utility, based in Cedar Rapids, serves 280,000 customers and encompasses 53 divisions. The DP department provides application development and maintenance, technical support and operations to its end users and operates with a 1981 budget of $2.2 million.

Iowa Electric's performance management system is comprised of a DP planning subsystem, a performance measurement subsystem and a problem resolution subsystem. Overall corporate planning includes strategic planning, directed out over the next 20 years, and tactical or operations planning, aimed at the next one to five years.

The computer center's planning methodology includes monthly preliminary plans consisting of equipment, software and services, staffing and training; a requirements analysis program consisting of long-range systems plans that are determined in conjunction with the users involved; and service objectives, consisting of internal and external application development and maintenance and the DP operations plans.

Iowa Electric's DP operation's service objectives are intended to bring its on-line system's response time to the 90th percentile on the average, Tubbs said.

Our widely accepted *UNIX*™ operating system is simplifying the use of computers. Designed to handle a variety of applications, it is being used to manage and maintain the telecommunications network, control experiments, develop software, process text, prepare documents, and teach computer science.

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$$\sum_{i=1}^{\infty} \frac{1}{x_i} = \pi$$

someone need only type: "Sum from i = 1 to infinity 1 over x sub i = pi." The computer does everything else.

Since 1969 the Bell System has installed more than 1100 *UNIX* systems. Along with other Bell Labs innovations in computing technology, these systems are enhancing the way the nation's telecommunications network is planned, designed, built, and operated. Through licensing agreements with Western Electric, universities have installed over 800 *UNIX* systems, and government and industrial facilities are using over 400.

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- Formulation of Information Theory
- Invention of error-detecting and error-correcting codes
- Demonstration of first general-purpose transistorized digital computer
- Development of computer operating systems
- Design of computer languages, including ALTRAN, SNOBOL, L6, and C
- Creation of computer graphics techniques for storing, manipulating, and presenting information
- Development of Fast Fourier Transform
- Design of central processors for switching systems having virtually no downtime

Looking ahead

Computing technology is having a major impact on the telecommunications business. It's increasing the Bell System's ability to provide new services and handle existing ones more efficiently. Today, for example, the nationwide telecommunications network links thousands of software-controlled electronic systems, making it by far the world's largest distributed processing network. We and our partners—Western Electric and the telephone companies of the Bell System—are putting technology to work so that the network will continue to evolve and expand its information-handling capabilities. The object, of course, is to meet the fast-growing and changing needs of Bell System customers.

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North Star Horizon	12:01.9	1:57.7
Cromemco System Two	14:52.6	2:48.0
Texas Instruments 771	22:05.4	3:38.1
Vector Graphic System B	19:30.0	5:56.5
Decstation 78	7:55.7	4:21.5
Radio Shack TRS-80 Model II	20:00.7	3:38.6
Apple II	21:11.0	6:17.4
Digital Microsystems DSC-2	13:24.9	3:28.8
Ohio Scientific C3-A	12:10.7	15:49.3
Alpha Micro AM-1011	5:18.3	3:25.3

Series 2 Results*** Systems $15,000 to $25,000	**C-1**	**C-3**
IBM 5110	29:47.2	4:11.0
Wang 2200VP	2:05.8	3:20.0
Texas Instruments FS990/10	*	3:18.6
Hewlett-Packard System 45	4:38.9	5:05.8
DEC PDP-11V03	14:43.4	4:14.0
Q1 Lite	6:50.7****	5:03.3****
Univac BC/7-610	12:09.2****	10:37.0****
Northern Telecom 405	*	**
Datapoint 1170	38:27.5	6:50.4
Randal 100	13:52.4	10:05.0
Hewlett-Packard 250	4:05.9	4:45.7
Texas Instruments DS990/2	*	2:48.3

*Test could not be run because of memory limitations.
**Test could not be run because of formatting limitations.
***Both Series 1 and Series 2 were run on the same programs.
****Results include both compile and run-time.

This is the twenty-fifth in a series of articles giving the highlights of benchmark tests conducted on popular small computer systems. The full reports were originally published by the Association of Computer Users, a 4,000-member nonprofit organization.

With the fastest times in several categories of any system tested in the Association of Computer Users' (ACU) benchmark reports of less-than-$15,000 computers, the Alpha Micro, Inc. AM-1011 is a strong contender among the systems tested so far.

While the AM-1011's price as tested nudged just over the Series 1 limit — coming in at a fully equipped system price of $15,605 — it far outpaced others in the scientific/engineering test, which is oriented toward numerical calculation ability. Its performance in the accounts receivable problem was only slightly less impressive. Although not in front, the AM-1011 was among the leaders.

Not surprisingly, the AM-1011 has sophisticated features which help out in the benchmark timings. A real-time clock and floating-point math processor are standard features. In addition, the system is set up for multiuser operations, requiring only terminal connection and a system file change.

The benchmark tests, performed for ACU by the Business Research Division of the University of Colorado, are standard applications written either in Basic or another language used on the computer. Comparisons of run times obtained for the standard programs allow us to estimate the relative speed of similarly priced computers when performing common tasks. The real-life applications problems, two of which are reported in this column, provide a mix of instructions which we feel is typical of such an application. Naturally, the programs used for benchmark testing are not identical to any which a customer would use in practice, and actual results on a customer application program might differ.

The Alpha Micro AM-1011 was tested without factory support at a site provided by a customer. This was done because Alpha Micro chose not to participate. Nevertheless, all went without a hitch and, as mentioned, the results were impressive. The more expensive AM-1051 was also run through the testing process for Series 3 ($25,000 to $50,000) computers and we plan to cover its performance in a later column.

As tested, the AM-1011 included an AM-110T processor, 64K bytes of memory, two floppy disk drives (2.4M bytes total) and software. Standard software items were the Amos operating system; extensive utilities; word processing capability; and the languages Basic, Pascal and Lisp. A Lear-Siegler, Inc. ADM-3A+ terminal and Texas Instruments, Inc. 820 printer rounded out the hardware.

A less-expensive system is also available. The AM-1010 uses an AM-100 processor, which does not run as fast, using 8 bits rather than 16. Either processor can be used with hard disk drives to upgrade the system and both 10- and 90M byte drives are offered (as is a tape drive).

The possibility of expanding an AM-1011 from a simple single-user system based on floppy disk storage to a hard-disk multiuser configuration is one of the computer's strongest qualities. Up to four of the hard disks can be added to a single computer and as many as 24 terminals can be connected. Total memory capacity is 380K bytes.

The operating system was designed to work with either large or small configurations. It offers several features to aid in accounting for utilization of the computer resource. A full line of utilities for file and disk management are also included, and a number of debugging aids are available in the Basic environment. These include breakpoints and single-step operation.

The Alphabasic itself had a number of features not usually found, such as PRINT USING and MAP statements. Variable names may be of any length, labels in place of line numbers may be used, and programs may be chained together. Line-by-line syntax checking is performed in the interactive development mode and once perfected, a compiled version may be stored for later use. Times shown in the benchmark table are run-only times.

While the Alphabasic did not include a build-in line editor (changes must be made by retyping the entire line), the utilities include a text editor and a VUE, which provides the necessary functions for editing programs under development.

Alphabasic Praised

User comments on the language and operating system were universally favorable. "I purchased the Alpha Micro because of price and the compiled Basic. Now, with hindsight, I find I purchased a powerful operating system as well," one customer said. Another said, "I'm used to working with a million-dollar computer . . . and I don't find myself limited on the Alpha Micro."

One interesting type of flexibility the AM-1011 provides is ability to use nearly any nonintelligent terminal as a workstation, since software for many common CRT terminals is included in the operating system. The cursor positioning systems of these inexpensive terminals are used together with the computer's screen editor to allow sophisticated terminal operations normally associated with more expensive CRT terminals.

Documentation reviewed prior to the benchmark tests was found to be complete and well written. A manual, which introduces the first-time user to computers and the Alpha Micro system, was available along with more detailed manuals for the system operator, manager, backup procedures, system generation and so on. Specialized programming manuals covered assembly language, higher level languages and interacting with the operating systems.

Software packages supplied by Alpha Micro include general ledger, accounts receivable and payable, order entry, inventory control and payroll. OEMs who sell turnkey systems supply much of the software in use by customers. Word processing can be accomplished by using the VUE editor utility along with TXTFMT, a text-formatting utility.

Dealers who sell the Alpha Micro systems provide most maintenance service. Board replacement in the field is combined with factory board service; Alpha Micro is working with a number of dealers to create a maintenance network for local support. Some of the users contacted had complaints about dealer service, but for the most part, customers said they had good relationships with dealers.

About 15 end-users were surveyed during the benchmark report preparation, one-third of which had a single terminal with the rest having either two or three terminals attached to their systems. Businesses included retailors, distributors, a mail order house and engineers. Two systems were being used by individuals engaged in personal research.

Most of the users had a solid background in computers and were able to develop their own software as well as refine that of others.

About the Author

Hillel Segal is president of the Association of Computer Users (ACU), a nonprofit association with members all over the U.S., Canada and many other foreign countries.

One of the association's key activities is the publication of its "Benchmark Reports." Each month a new 24-page report is produced covering another computer system.

In addition, ACU publishes seven bimonthly newsletters for users of small computers, midi computers, large computers, time-sharing systems, distributed processing systems, word processing systems and home and hobbyist computers.

A complete package of information about the benefits of membership in the Association of Computer Users is available from them through P.O. Box 9003, Boulder, Colo. 80301.

Opponents of WU International Service Testify

By Phil Hirsch
CW Washington Bureau

WASHINGTON, D.C. — "On Day One after it begins offering international service, Western Union (WU) will control approximately 80% of the total international and domestic telex revenue," the board chairman of ITT World Communications told a Senate subcommittee here recently.

George Knapp was one of several international record carrier (IRC) executives who testified against pending legislation that would repeal Section 222 of the Communications Act. Enacted several years ago, Section 222 confines the telegraph company to domestic record communication services.

Another opponent of repeal — Eugene Murphy, president of RCA Global Communications, Inc. — indicated the IRCs would accept the pending bill if Western Union's entry into the international market is delayed three years. He also said the IRCs should be allowed to offer domestic services, and Western Union must be required to interconnect its network facilities with those of the IRCs "on fair terms for both international and domestic telex and telegram service."

Repeal of Section 222 is favored by the National Telecommunications and Information Administration (NTIA), and by the Federal Communications Commission (FCC). NTIA Acting Administrator Dale Hatfield said repeal "could encourage the reduction of rates and further stimulate the provision of new and innovative services." After reiterating this point, FCC Commissioner Anne P. Jones said "we have adequate power to assure interconnection." She also believes it is unnecessary to impose any moratorium on Western Union's entry into the international market.

Datacomm Briefs

Broyhill Wants Power Over NTIA Budget

WASHINGTON, D.C. — Rep. James Broyhill (R-N.C.), ranking minority member of the House Energy and Commerce Committee, has introduced legislation requiring NTIA, as well as the FCC, to have their budgets authorized by the committee. Currently, the two agencies' budgets have to be approved only by the House and Senate appropriations committees.

Broyhill, in introducing the NTIA bill, said he has valued the agency's "wise counsel" and does not now believe it should be "reined in," but NTIA "has many important functions that should be reviewed by Congress on a regular basis.

Texas Videotex Trial Attacked by Adapso

WASHINGTON, D.C. — More opposition to AT&T's proposed Electronic Information Service (EIS) videotex trial in Austin, Texas, surfaced last week when the Association of Data Processing Service Organizations, Inc. (Adapso) asked the FCC to investigate the project.

Earlier, the Texas Newspaper Publishers Association filed an objection with the state public utilities commission (PUC).

The Texas test is considered significant because it is part of what appears to be a major phone company effort to enter the on-line information services business. Related activities include AT&T's co-sponsorship, with Knight-Ridder Newspapers, Inc., of a videotex trial in Coral Gables, Fla., and a pending tariff in Pennsylvania covering a voice-based electronic message service called Custom Calling II. The latter would be a commercial offering, not a test. AT&T already has announced that once Custom Calling II is OKed in Pennsylvania, the service will be tariffed in several other states.

Adapso, in last week's statement to the FCC, said the Austin EIS trial is "inconsistent" with the Communications Act. Also, it violates the FCC's Final Decision in the Second Computer Inquiry; that decision requires "enhanced services" such as EIS to be offered through a separate subsidiary rather than directly by an AT&T operating company.

Besides telephone directory information, the Austin trial will provide teleshopping services and give each user a "personal data base" in which he can include "messages to other family members," Adapso said — an apparent reference to the possibility that EIS will metamorphose into an electronic message system serving residential as well as business customers.

Under a contract signed by AT&T and Southwestern Bell, the former will finance and manage the trial, and — among other responsibilities — "establish data base content," Adapso said.

In responding to the association's complaint, Bell is likely to use the same argument already employed against the Texas Newspaper Publishers Association — i.e., the Austin trial, since it is not a commercial service offering, is not barred by the Communications Act or the computer inquiry decision.

An examiner for the Texas PUC already has recommended approval of the EIS trial.

Calendar

April 12-15, Dallas — The Task/Master Users Group Meeting. Contact: Patricia Wojtas, P.O. Box 866, Norwalk, Conn. 06856.

April 13-14, Chicago — Financial Analysis for Telecommunications Professionals. Contact: *Business Communications Review,* 36 S. Washington St., Hinsdale, Ill. 60521.

April 13, Montreal — Stradis, A One-Day Overview. Contact: IST, Ninth Floor, 888 Seventh Ave., New York, N.Y. 10106. Also being held April 14 in St. Louis and April 15 in Los Angeles.

April 13-17, New York — Structured Data Base Design. Contact: IST, Ninth Floor, 888 Seventh Ave., New York, N.Y. 10106.

April 13-15, New York — The Automated Office. Contact: Department PR, NIMR Seminars, P.O. Box 3727, Santa Monica, Calif. 90403.

April 13-15, Washington, D.C. — Seminar To Unscramble Software Development Problems. Contact: Technology Transfer Institute, Inc., P.O. Box 49765, Los Angeles, Calif. 90049.

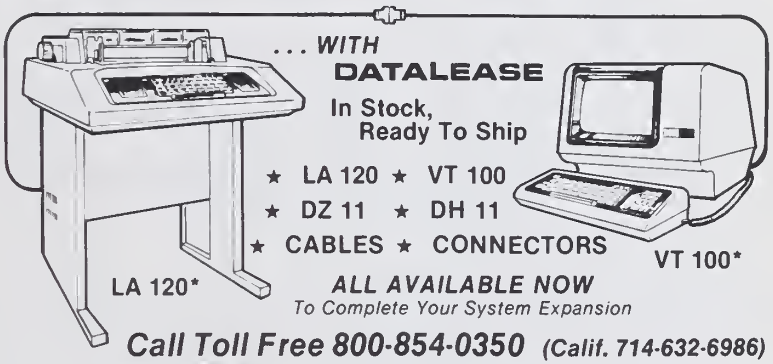
April 13-15, Pittsburgh, Pa. — Structured Programming Workshop. Contact: BSI, 4720 Montgomery Lane, Bethesda, Md. 20014.

April 13-14, Boston — Data Communications: Advanced Concepts and Systems. Contact: Seminar Department, Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075. Also being held April 13-14 in Cleveland, April 23-24 in Chicago and April 27-28 in San Francisco.

April 13-15, New York — Introduction to Teleprocessing Software. Contact: Seminar Department, Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075. Also being held April 29-May 1 in Seattle.

April 13-15, Los Angeles — Systems Analysis and Designs: Concepts and Effective Practice. Contact: Seminar Department, Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075. Also being held April 29- May 1 in New York.

April 13-16, Washington, D.C. — Computer Contract Negotiations. Contact: Registrar, Brandon Consulting Group, Inc., 1775 Broadway, New York, N.Y. 10019.



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UCLA Schedules Spring Courses

LOS ANGELES — Courses in information processing and management information systems applicable toward UCLA Extension's Professional Designations in Systems Analysis, Applications Programming, Systems Programming and Systems Management will be offered this spring. They are being presented in cooperation with the Association for Computing Machinery, Data Processing Management Association, Association for Systems Management and the American Institute of Industrial Engineers.

"Introduction to Management Information Systems and Systems Analysis" will cover elements of typical business systems and how they combine into an operational system.

"Tools and Techniques of Information Systems Design" will cover data gathering techniques and approaches to documenting manual and some computer aspects of a business system.

Other courses being offered include "Management Information Systems for Planning and Control" and "Data Communications and Distributive Processing."

Costs for these programs range from $90 to $200. Complete details are available from Management, Labor & Business, UCLA Extension, P.O. Box 24901, Los Angeles, Calif. 90024.

Call for Papers

1981 IEEE PROFESSIONAL COMMUNICATION SOCIETY CONFERENCE, Arlington, Va., Sept. 16-18.

Authors are invited to contribute papers on one of the following topics: communications technology; conducting an effective technical meeting; information gathering, storage and retrieval; statements of work, specifications, proposals; using computers in technical communications; visual aids and their use by individuals; and written and/or oral technical presentations.

A 300-word abstract is due on April 30, and authors will be notified of acceptance by May 31. Final manuscripts must be in by July 10. Further inquiries should be directed to Dr. Daniel Rosich, Conference Chairman, University of Connecticut, School of Business Administration, Stamford, Conn. 06903.

IEEE COMPUTER SOCIETY COMPCON FALL 81, Washington, D.C., Sept. 14-17.

Productivity is the theme of this conference, and papers are being sought on relative software, hardware and other new or innovative practices.

Four copies of the papers should be submitted by April 1 to Dr. Basili or Dr. Yeh at the University of Maryland, Department of Computer Science, College Park, Md. 20742.

CPEUG 81: 17TH MEETING OF THE COMPUTER PERFORMANCE EVALUATION USERS GROUP, San Antonio, Texas, Nov. 16-19.

The focus of this conference is "Increasing Organizational Productivity: Increasing DP Service and Quality While Minimizing DP Cost." CPEUG 81 is inviting contributions in all topics bearing on this theme, with special emphasis on CPE theory, practice and results in very large system management; embedded computer systems; work-load forecasting and modeling; networks and telecommunications; time-sharing and distributed systems; measuring user satisfaction; quality assurance; security; acquisitions and benchmarking; capacity planning; energy; cost accounting; mini and microcomputers; system design and maintenance; CAD/CAM; on-line order entry; automation; command, control and communication; life cycle costing; and contingency planning.

Three awards will be presented for the best papers. Abstracts are due, in triplicate, by April 15, and final papers, also in triplicate, are due on June 1. Notification of acceptance will occur by August 1. Entries should be directed to Thomas Wyrick, Department of the Air Force, Fedsim/NA, Washington, D.C. 20330.

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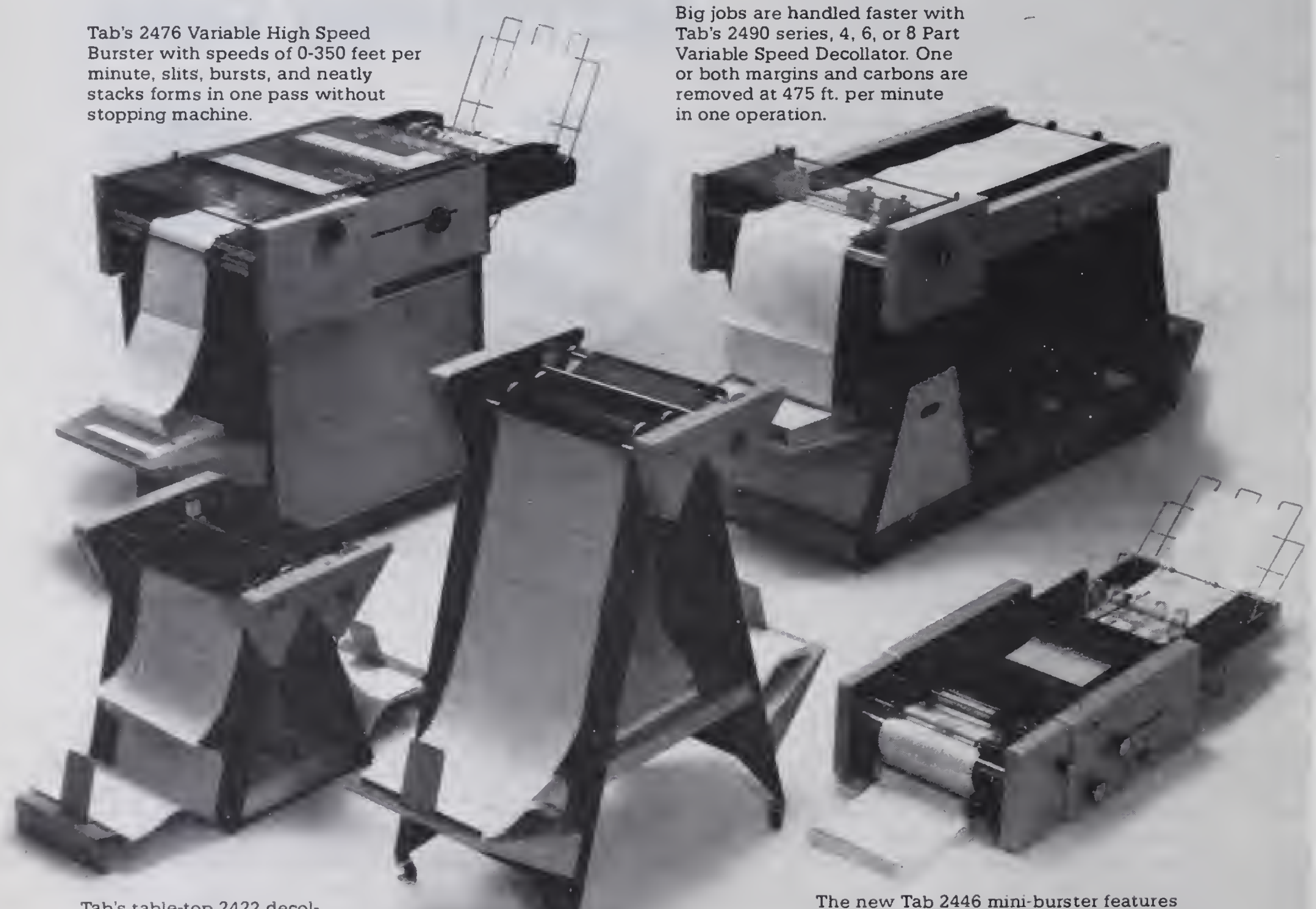

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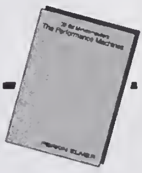

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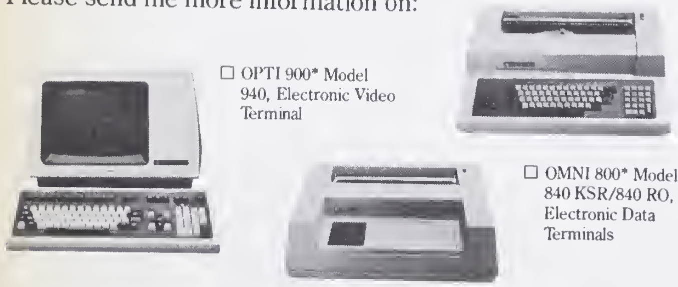

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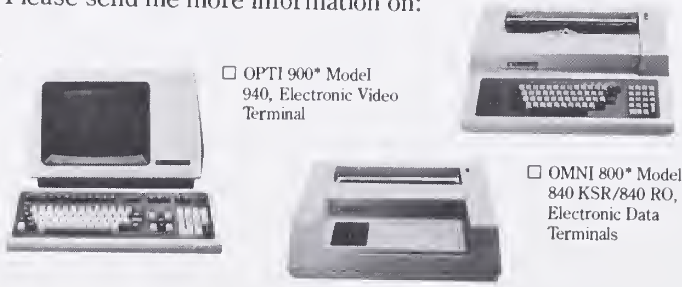

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☐ Electrical/Electronic Equipment
☐ Automotive Industry
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EDITORIAL

Jump on This Bandwagon

For years — 15, to be exact — there has been a great hubbub about a proposed standard for an interface between I/O equipment and computer systems. And now the standard is actually coming closer to reality — at least in a very limited way (see story on Page 1).

Unfortunately, with all the debate involving technologists, lawyers and marketing personnel ad infinitum, the underlying economic issue that should concern all users of computer equipment has often been obscured.

The standard that has been adopted is indeed very old, as the opponents claim. But the new IBM 3081 uses the standard — so much for the technological obsolescence argument.

The economics of the issue are clear, however. The standard would allow users to attach peripherals made by firms other than their mainframe manufacturer.

Today IBM users are generally the only ones who have this luxury. As a result, they have a wide range of vendors from which to choose in designing their optimum systems. Many of the independent vendors offer equipment that is cheaper, easier to operate or more available than IBM equipment.

This is the free enterprise system at work — manufacturers see an opportunity to make an equivalent or better product at a lower cost and consumers (users) therefore receive a break.

However, it is only the large base of IBM users that makes such a system practical — and profitable for independents.

The federal government came up with the idea for an interface standard so that it would have more choice of peripherals for its non-IBM systems.

Obviously since competition has worked so well in the IBM-compatible world, it would be a good idea to spread that competition to the entire computer world.

Well, the manufacturers of other computer equipment — Sperry Univac, Honeywell, Inc. and Burroughs Corp., for example — have fought off this competition, claiming technology as their reason.

Frankly, the real reason again probably has more to do with economics than technology. Many of the other mainframers offer disk and tape systems that are either more expensive or less advanced than the units available to the IBM world. They make lots of money on these units — and their users have no choice but to take what they are given.

A standard would clearly benefit users — they could get the most up-to-date equipment at the lowest possible prices through a very competitive industry.

Some manufacturers would be hurt because they would have to begin to face some real competition and offer either superior products or lower priced ones to hold their base. But that's free enterprise.

The artificial lock-in that these companies enjoy should not be tolerated by users, who should get on the standardization bandwagon and support the new efforts in this area.

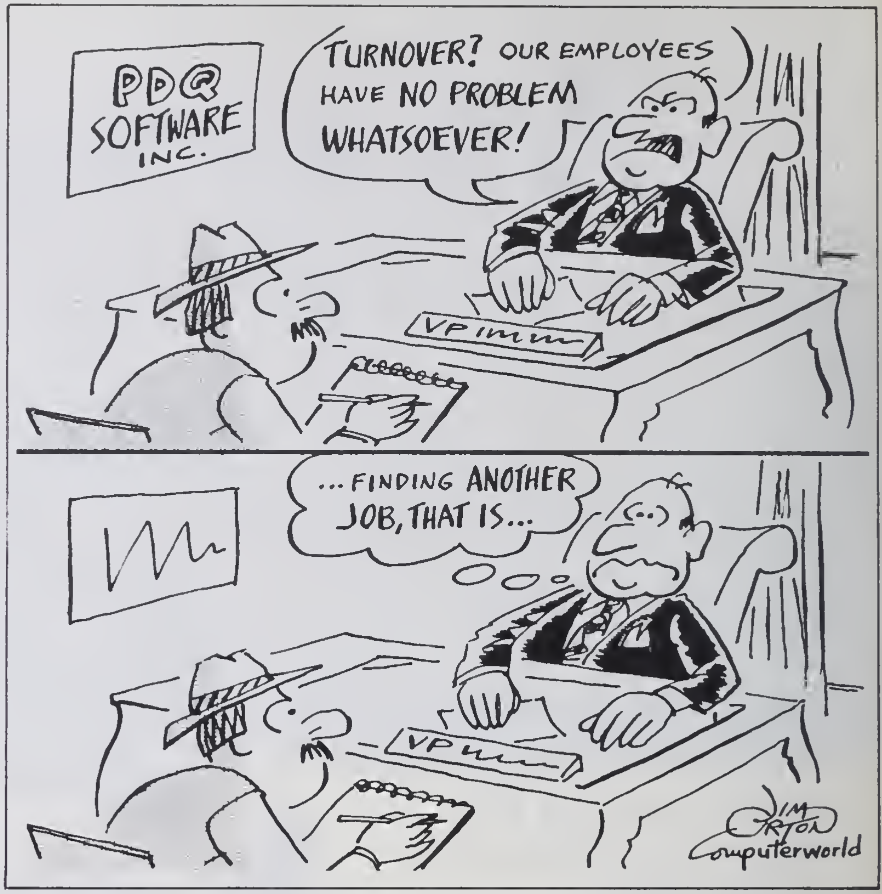
DATA PAST

Five Years Ago
March 8, 1976

NEW YORK — RCA corporate officials who decided to close down that firm's computer operations did so using projections that contained a $100 million mistake, V. Orville Wright, a witness for the government in its antitrust trial against IBM, said here. At the same time, Wright revealed that Mohawk Data Systems had offered RCA $80 million more for its computer business than had Univac but, for reasons he "was not privy to," corporate officials sold to Univac instead.

Ten Years Ago
March 10, 1971

OAKLAND, Calif. — Police armed with a search warrant raided a University Computing Co. (UCC) service bureau in Palo Alto and forced UCC to duplicate all its tapes and punched cards and to dump disk packs and core. Police impounded the data, and a UCC employee was charged with grand theft. He had allegedly tapped Information System Design's (ISD) computer to steal a proprietary program through unauthorized possession of sections of the ISD security code.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LETTERS

Software Piracy

The recent Turnaround Time column concerning breach of software licensing [CW, Feb. 2] dealt with a subject which causes our company much concern.

The purpose of a licensing agreement is to protect an investment of many man-years of development effort and is worded in such a manner as to ensure the licensee understands the "use" of proprietary software is limited to the use and restrictions defined in his license agreement, which is governed by the license fee for this proprietary software. Duplication of any proprietary software outside the bounds of this license agreement is theft, and it costs us, the developers, money. Unfortunately, this is not uncommon.

There are many different ways in which software piracy occurs, some deliberate and some seemingly innocent.

However, software piracy is becoming such a concern to all software developers that we are beginning to take stronger mutually supportive action to protect our investments. A recently formed organization, the Association for Software Piracy (ASP), is the latest step taken to assist in minimizing this problem.

We are not unreasonable people to deal with. However, we see no reason to condone theft or allow our products to be "given away." *Computerworld* should be warning of the consequences of receiving or distributing unlicensed software, instead of the lukewarm reaction in your column. Our breach-of-contract stories cost us thousands of dollars a year, and we do not wish to build in software piracy as part of the cost of doing business.

Adrienne H. Webb
Digital Information Systems Corp.
Carmichael, Calif.

IBM Actions Misrepresented

"What are the Soviets doing in Silicon Valley?" [CW, Feb. 9] contained a number of erroneous statements about IBM.

IBM has never engaged in any effort or "campaign . . . to avoid or undermine the present embargo on high-technology trade with the Soviets." What business we've had with the Soviet Union — which has never exceeded .1% of IBM's revenues — has always been guided by U.S. foreign policy and conducted in full compliance with all U.S. regulations."

If there were any "secret" meetings to devise ways to "avoid the Carter embargo," as alleged, no IBM representatives were in attendance. IBM did have a meeting in March 1980 with Amtorg representatives specifically to inform them that the embargo had legal precedence over then-existing contracts.

No IBM office in Austria or anywhere else has provided embargoed spare parts.

Despite the article's nonspecific reference to company denials or refusals to comment, let the record show that IBM has not refused to comment on the misinformation that seems to abound on this subject.

Victor J. Goldberg
Vice-President

IBM
Armonk, N.Y.

Computerworld welcomes comments from its readers. Preference will be given to typed, double-spaced letters of 150 words or less. *Computerworld* reserves the right to edit letters for purposes of clarity and brevity. Letters should be addressed to Editor, *Computerworld*, Box 880, Framingham, Mass. 01701.

THE TAYLOR REPORT/Alan Taylor

Codasyl Shut Door On Users' Complaints

David Nelson, chairman of the Codasyl Cobol committee, wants to know why people faced with the incompatible 1981 Cobol standard are complaining now, at what he calls "the end of the standard development cycle," but did not speak up five years ago at the cycle start [CW, Feb. 16].

Well, users *did* complain at the cycle start, but the neat Codasyl bureaucracy simply cut them off, so that the language developers never had to be bothered with facing the compatibility question. Codasyl — not the users — delayed the consideration of this matter for another five years or so!

The first interstandard compatibility question arose in 1973 and centered on report-writer facilities. At the time, Codasyl included a Cobol-language writing committee and an information committee, which was supposed to keep the public informed, but did not.

Report Writer Killed

One bright day that year, the language people suddenly and without checking with the report-writer users, voted to kill the entire report writer facility. At least that is what their minutes said later.

While the facility was not perfect, by doing away with it, Codasyl prevented the American National Standards Institute's (Ansi) X3J4 committee from ever improving it. As Nelson said, Codasyl decisions constrain the official Ansi standards people under a 1968 agreement (of doubtful legality).

After the story was told in this column, many users did write to Codasyl, both on the report writer and on upward compatibility in general. And I don't think it was accidental that at the next meeting the decision was reversed.

At the time, I discussed with many of the Codasyl leaders the whole question of why Codasyl had not known of the interest in upward compatibility. The secretary said that no reason for any change could ever be given, nor could changes be checked for compatibility. This, he said, was because the various voting members might have different reasons for supporting the changes, and the voting did not involve consideration of whether changes were consistent with any given policy.

That explanation gave the official Codasyl line, but no information.

Jack Jones, then chairman, was the most informative. He said that upward compatibility was simply not worth talking about, as the various facilities were only experiments which might or might not work out in practice. If the users of a facility — like report writer or communications — were guaranteed the right to expect to keep their programs running, the language developers would be constrained in their ability to experiment. Jones also said later that he would do anything necessary to keep the developers free to go their own way without interference.

Jones also talked about the fact that the Codasyl Information Committee had not disturbed the information that the report writer was under attack and would be voted upon at any time. There was no money for issuing press releases, he said, or to seek outside opinion on proposed changes. This, he said, was why Codasyl could not per-

(Continued on Page 40)

READER COMMENTARY/Richard J. Bevilacqua

Structured Methods: Eschewing Obfuscation

In the preface to his book on program design, copyright 1975, Glenford Myers spoke ruefully of how a new term, "composite design," had to be coined to represent the concepts put forth in his book. It seems that the term "modular design" had been used and abused to the extent of precluding much interest in another book on this topic, regardless of the book's significance.

This same fate seems to have befallen the term "structured method." Not only has the term become shop-worn, but one would judge from the articles, letters and commentaries appearing in today's literature that structured method equals structured programming. Thus, based on someone's experiences with structured programming, we read that structured methods work, don't work, inhibit creativity, increase productivity, add to overhead . . . ad absurdum.

I wonder what the Surgeon General has determined? For all the usage of the term, how many really understand its meaning?

Why should this bother me, you ask, in an industry full of buzzwords, not to mention half, full and double words? My answer is that we do ourselves a great disservice when we allow misconceptions, prejudices and ignorance to preclude the introduction and use of tools and techniques that can be very effective in resolving many of the productivity problems facing us, the DP community.

Why this condition exists is subject for a later commentary. But if I may quote Pogo, "We have met the enemy and he is us." (The hype of many of the "structured" vendors hasn't helped either.)

But my intention here is to clarify. Deferring to a higher authority, I quote a Mr. D. Webster who defined "structured" as "made up of interdependent parts in a definite pattern of organization" and "method" as "a way, technique or process for doing something." If I throw in "disciplined," a structured method is "an organized, disciplined technique for doing something."

Could Dijkstra, Hoare et al have meant anything more?

Proceeding logically, there may be one, two or many organized, disciplined techniques for programming, one of which may exclude the use of GOTOs. There may also be one, two or many organized, disciplined techniques for doing analysis or design.

In fact, there are. There are at least a dozen "structured" design techniques and about the same number of "structured" analysis. Yet to the average DPer, structured analysis means data flow diagrams and structured design is structure charts. And some very powerful, effective and appropriate tools go begging.

Why More Than One?

Why do we need more than one technique? Let's look again at some definitions. Analysis is "the separation of a whole into its constituents with a view to the examination and interpretation of the elements and their relationships." Design is the synthesis of ele-

(Continued on Page 41)

THE HUMAN CONNECTION/Jack Stone

Are Your Performance Standards 'Right'?

The subject of performance measurement for DPers has apparently touched a sensitive nerve with *Computerworld* readers, as my mail bag is brimming over with correspondence on the subject.

One particularly impressive piece of writing was a selection from the *Supervisor's Guide* for the U.S. Army's Electronics Research and Development Command (Eradcom). My attention was grabbed by this passage: "Performance standards can be established for all positions. While it is true that specific quantitative standards are more easily established for routine, repetitive production-type jobs, written standards can also be established for scientific and technical, professional, supervisory and managerial jobs as well."

So I pored through it and decided to quote some salient passages for you in this and next week's column, with the prospect that its guidelines may prove useful to you.

Eradcom says that the process of setting standards begins with a clear statement of what is to be accomplished in the job: the description of a product, service or outcome:

"There are three characteristics of a properly defined job element: 1) it must describe results that are measurable or observable; 2) it must describe results that are attainable by the incumbent (that is, within the authority of the position); and 3) it must be derived from the mission of the organization and be compatible with the results assigned to other organizational components."

The document goes on to discuss certain considerations involved in setting standards.

"The first step is to ask questions regarding the fundamental nature of the job: What are the indicators of success for the job elements? How well or how accurately should a task be done? How soon? At what cost?

"The answers to these questions will help identify the measurable aspects of job elements and the dimensions by which they can be measured, including the required levels of accomplishment.

"The number of standards necessary depends upon how many different measurements the supervisor feels are necessary to adequately define performance expectations. Although it is possible that some job elements may be adequately covered by one standard, in most cases it will be necessary to establish specific and separate standards for each supporting task within a job element.

"In setting standards, a supervisor is not doing anything new or unusual. What is different is that the supervisor is striving to be as objective and accurate as possible, to measure the right performance parameters and to document the criteria used for evaluation. The supervisor is seeking performance standards that are valid and can be used to prove that the evaluation is accurate. The 'right' parameters that the standards should measure are results — the degree of accomplishment of the job elements — and not such things as the character traits of the employees or how busy they are."

Then the characteristics of a proper performance standard are described.

"• It should enable the employee and supervisor to differentiate between acceptable and unacceptable results.

"• It should present some challenge to the employee.

"• It should be realistic: It should be attainable by any qualified, competent and fully trained employee who has the necessary authority and resources.

"• It should be a statement of the conditions that will exist and will measure a job element when it is performed acceptably.

"• It should relate to or express a time frame for accomplishment.

"• There should be a method of observation — a means of measuring the performance against the requirements of the standards."

A final comment on the notion of performance "acceptability."

"Standards should describe the fully 'acceptable' level of performance. 'Acceptable' in this context does not mean mediocre or average; it means a level of performance that will fully satisfy the supervisor's expectations and allow for successful accomplishment of that portion of the organization's mission, functions and goals for which the job applies. If standards are set too low, productivity will suffer and employees may lack a challenge in their work. If standards are set too high, employees may fall short and their performance may appear weak relative to the standards. And they may even quit trying."

LETTERS

Annoyed by CRT Noise

After reading *Computerworld's* recent article on stress and CRT terminal usage [CW, Feb. 16], I feel I should make some comments. First, from a review of the literature on the subject, it is clear that there isn't much hazard from electromagnetic emissions. But I, too, find working long hours at my CRT to be stressful. It is more than just screen glare and flicker, though these don't help.

What else is there? I have noticed, ever since I was a child, that video display devices (TVs, CRTs and so on) emit a very high-intensity, high-frequency whistle. When I walk into a room, I can tell at once if a TV or CRT is on without having to look. It's like pressure in my ears.

When I had to take courses in college by closed-circuit TV, I had to stuff wads of paper in my ears, though sometimes I could find a position where each ear was in a null of the standing-wave pattern set up by the monitor.

I imagine a whole room full of CRTs at a major transaction processing center would be torture. Clearly, I have greater sensitivity in the high-frequency range than most people, but maybe others are affected by this nearly ultrasonic emission too, even if they don't hear it.

So, here are some unaddressed questions:

(1) Are there any stress-related effects of intense ultrasonics, even if you can't hear them?

(2) What is the frequency of the whistle I hear? (It sounds like it's about 18 kHz.)

(3) How would one go about acoustic insulation for these frequencies in a CRT? What sort of materials are useful? (Is there something I can paint or glue on the inside of my CRT to absorb the sound?)

I have become fond of working with a CRT — this letter was composed on one — but I would just as soon not have to wear earplugs to do so. I would like this issue addressed by someone — maybe the unions, if not the CRT manufacturers — before we all switch to flat-panel LCDs.

Stuart R. Dole

Petaluma, Calif.

Nonsensical Management

Whenever I read about the low productivity and outmoded programming practices commonly found in our industry, I can't help wondering whether this isn't largely the result of nonsensical management and personnel practices in many of our installations.

As a member of a software development group in the early '60s, I was required to spend half a day per week on the job reading computer journals and trade magazines. Needless to say, the group in which I worked developed superb software and used modular programming, top-down design and so on. (Yes, these concepts were in existence — and practiced — in the early '60s.)

Today I find myself working with companies that not only do not *require* journal reading on the job, they actually *forbid* it. If a person picks up a copy of the latest *Computing Surveys* while waiting for computer time, a meeting or whatever, he is treated like a criminal. Is there any wonder that we have programmers and systems analysts using programming concepts that date back to the '50s?

Unless our installations acquire some mature management in the not-too-distant future, I'm afraid that our industry is doomed to at least another 10 years of low productivity and overwhelming software problems.

P.A. Anderson

Chicago, Ill.

Looking for 'Onsite' Users

I am trying to locate ADP Network Services Onsite (Digital Equipment Corp. Decsystem-2020) users for the purpose of forming a users group. I have been able to locate only a few users out of more than 50.

It is in the interest of each user to join such a group to facilitate information exchange and to communicate consensus positions to Network Services. I can be reached at Bank Building Corp., 1130 Hampton Ave., St. Louis, Mo. 63139.

Sam Patterson

St. Louis, Mo.

Joining in Protest

The front-page article "Women Protest Anti-ERA Illinois at Site of NCC" [CW, Feb. 9] suggested that among computer professionals, only women are concerned with the status of the proposed Equal Rights Amendment (ERA).

I know I am not the only male DP professional who supports the ERA and the National Organization of Women's suggested boycott of nonratified states. I hope that conscientious men will join with those women who wear black armbands at the National Computer Conference to protest the continuing denial of equal rights to American women.

Joe L. Caruthers

Tacoma, Wash.

Klasser's 'Passages'

The program chart below utilizes the very most current structured design and documentation techniques to depict the program's processes. It is easily read and may be used as a prime example of good methodology. However, it is flawed and will need to be improved and corrected in the "complete technical design" task of the installation phase of a development project.

It may be subtitled either "Passages," "God's Plaything" or "The Rat Race."

Allan Klasser

Skokie, Ill.

About the ERA

In regard to the article on the ERA [CW, Feb. 9], I would like to set the record straight. Unfortunately, the Equal Rights Amendment does not state "that women and men have equal rights under the law."

What it does state is:

Section 1: Equality of rights under the law shall not be denied or abridged by the U.S. or by any state on account of sex.

Section 2: The Congress shall have the power to enforce, by appropriate legislation, the provisions of this article.

Section 3: This amendment shall take effect two years after the date of ratification.

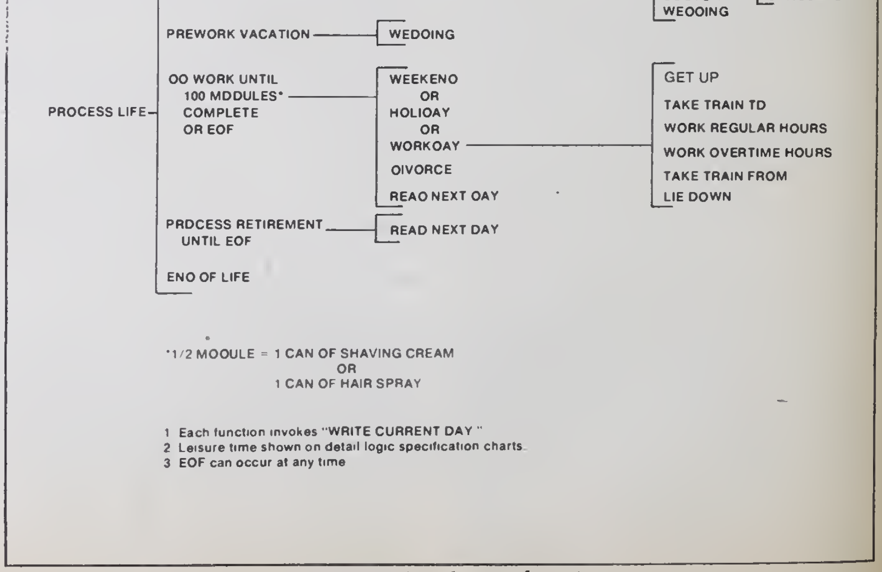
Nowhere in the amendment are women mentioned. Nowhere is sex defined. Sex is a word that can have half a dozen meanings, and therein lies the problem.

No one knows all the ramifications if the amendment is passed. The federal courts will in effect become legislators. Pandora's box will be opened on matters of marriage laws, homosexual rights, draft registration, women in combat, benefits for widows and homemakers, sex integration of sports, privacy in public facilities and so on.

If *Computerworld* elects to report on such nontechnical, emotionally charged issues, then it should do a better job of not only accurately reporting the facts, but also objectively reporting all sides of the issue.

T.W. Woods

Roanoke, Va.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FREOUENCY ONE LIFETIME
PROCESS LIFE
BEGIN LIFE
SLAP ON BEHINO
REAO NEXT DAY
PROCESS CIRCUMCISION RITUAL OR PROCESS BAPTISMAL RITUAL
OO SCHOOL UNTIL ENO OF SCHOOL
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PRDCESS RETIREMENT UNTIL EOF
READ NEXT DAY
ENO OF LIFE
*1/2 MOOULE = 1 CAN OF SHAVING CREAM OR 1 CAN OF HAIR SPRAY
1 Each function invokes "WRITE CURRENT DAY"
2 Leisure time shown on detail logic specification charts.
3 EOF can occur at any time

'Passages' (see letter above)

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LETTERS

Few Want Top Slots

I wish to reply to the editorial "Still Too Scarce" [CW, Feb. 9]. I am tired of hearing or reading about how few women there are in DP management.

I agree that there are many women programmers, project leaders and systems analysts. But my experience has shown me that there are really very few women who express a desire to move into DP management. Most women in DP are not eager to develop the business skills required, nor take on the responsibilities the job entails.

The ratio that should be investigated is the difference between the number of male vs. female DPers who actively seek and will accept the responsibilities related to DP management.

Jeffrey S. Jolly
St. Louis, Mo.

Contact Your CPA

In his article "So You Need a Consultant . . ." [CW, Feb. 9], Steven Epner omitted one major source of consulting. Considering Epner's involvement in the Independent Computer Consultants Association, this is not particularly surprising.

I would like to suggest that any firm seeking consulting assistance might wish to contact its certified public accounting (CPA) firm. A firm's auditors are perhaps best equipped to understand the problems of the company, since they are heavily involved in it through their annual audit.

Most CPA firms today employ competent professionals who will be pleased to assist their clients in hardware/software acquisition, system design and other aspects of DP.

Joseph A. Leubitz
Chicago, Ill.

Erroneous Conclusion

I greatly appreciate *Computerworld*'s support in announcing MDP32, our multidrop support software package for Perkin-Elmer Corp. terminals [CW, Feb. 2], but I did notice an editing change that leads to an erroneous conclusion about MDP32.

The article indicated that MDP32 supports 32 terminals. It does, all right, but that was supposed to read "32 terminals per line."

Since any Perkin-Elmer 32-bit machine can easily support four eight-line communications multiplexers, MDP32 would be able to support 1,024 terminals in such a configuration.

Warren W. Wubker
President
Transaction Data Systems, Inc.
Orlando, Fla.

Personality Types

The brief introduction to Carl Jung's theories of personality types, which formed the basis of the article "I'm OK, You're OK, Maintenance is OK" [CW, Jan. 12] will, I hope, do more for the understanding of people in data processing, in the long run than anything else I've seen in an industry publication.

The author's interesting approach to application of these theories to people working in system development is a step in the right direction.

We need more of this kind of analysis. We need the recent report in *Computerworld* that Peter Drucker (on the lecture circuit) repeated the simplistic old saw that there are two types of people, managers and technicians, a lot less.

Preparing oneself to be a manager or a technican is largely a matter of motivation.

To set the record straight regarding Jung's theory, Jung did identify four personality functions.

These four functions and their opposites are:

1. Introvert-extrovert.
2. Intuitor-sensor.
3. Thinker-feeler.
4. Perceptive-judgmental.

Jung's theory leads to 16 possible personality type combinations. My guess is that there is a variety of personalities among effective managers and systems personnel, including technicians.

Joyce M. Surtes
Mt. Vernon, N.Y.

Over and Under

In the Feb. 2 letters column, William R. Fairchild stated that "one cannot possibly underestimate anything by 126%." I have one question. If I estimate something to be 100 units and it results in 226 units, by what percent did I underestimate the number of units?

However, I do agree that one cannot possibly *overestimate* anything by 126%. Example: estimate equals 226, result equals 100, percent overestimated equals 55.57%.

Leon J. Panko
Chicago, Ill.

Looking for Author

I have compiled a book titled *Techniques of Program and System Maintenance* published by Ethnotech, Inc., Lincoln, Neb.

In the first edition, I included an article "Creativity Seen Vital Factor, Even in Maintenance Work" by Robert R. Jones [CW, Jan. 23, 1978] with the permission of *Computerworld*. For the new edition of the book, I need the author's permission.

I would appreciate it if Robert R. Jones, or anyone knowing his address, would contact me at 1787B West Touhy, Chicago, Ill. 60626

Girish Parikh
Chicago, Ill.

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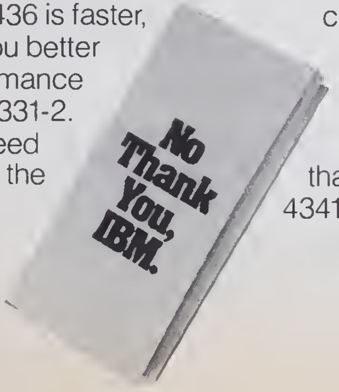

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Codasyl Evaded Comments

(Continued from Page 37)

form the type of sampling of opinion that could have prevented the report-writer problem.

It looked like a nice vicious circle which would keep users out for want of a few postage stamps. So I got the support of a few members of the Institute for the Certification of Computer Professionals (ICCP) to agree to help the Codasyl Information Committee get response without money. The idea was to get feedback on proposed changes to the language people, using the societies' various journals. This plan was agreed upon at a meeting of the Codasyl Information Committee called by its then-chairman, Warren Simmons, at U.S. Steel headquarters in Pittsburgh.

The goal of presenting the changes to the public before they were voted upon didn't sit well with many people. So before the next meeting, the Codasyl Executive Committee simply abolished the information committee and came out with some rather one-sided propaganda, with postage courtesy of U.S. Steel. (Funny, money never seemed a problem when the Codasyl powers wanted to spend it!)

The language developers who wanted free rein may not have been the ones who inspired the hurried abolition of that Codasyl committee. It may have been the Executive Committee group. (I remember calling them "Cobol barons" at the time.) And certainly the information committee was going to have to explain the rules of the game before the public could provide effective feedback on changes. That meant explaining the 1968 Codasyl-Ansi agreement which, as Nelson said, still constrains X3J4, although it was created in a time which now looks technically primitive.

But the committee would have to find the text of that agreement. I never found it, and I think it is of very dubious legality if it really exists. It might even open up some X3J4 members and their employers to the type of suit that has been threatened against them. (To this extent, I must withdraw my previous objection to users suing X3J4 [CW, Feb. 9]. It might be useful at that, particularly if they also have Codasyl memberships.)

In New York, Ansi denied knowing anything about the agreement. And after searching for more than a year, I gave up.

The Codasyl Information Committee was promised the agreement would be produced at its next meeting. But that was first postponed and then, as noted above, cancelled. So perhaps Codasyl's problem lies in producing that agreement for users to review while they are demanding upward compatibility. The agreement might be used to prevent a policy dealing with upward compatibility from being inserted into the standards process, no matter how much users may value it.

Looking Forward

But, as Nelson knows, the agreement does exist, and it is now causing Cobol to fall behind the times by never allowing a Cobol system to be safe after being written. Newer languages can do better than that, and today's operations demand more user-oriented treatment than was needed 13 years ago.

Until the agreement is produced and changed, Cobol will not be a strong long-term language, and fights over upward compatibility will occur every time the standard is updated. Ostrich-like actions like having the agreement in 1968, the abolition in 1974 of that Codasyl Information Committee and the recent criticism of users for not making themselves heard will not stop the upward compatibility fight. Upward compatibility can be faced now.

In fact, John Brophy, the user whom Nelson seems to have particularly in mind, has an idea on how to face the problem. Others probably have ideas, too. Nelson and other Codasyl members may have some. If so, I'd like to publish them as well as Brophy's for discussion.

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Eschewing Obfuscation

(Continued from Page 37)

ments according to a plan, to solve a problem or serve a specific purpose. Thus defined, both analysis and design are activities that occur at several levels during the system development process.

For example, we "analyze" the business functional requirements, the environmental interfaces and constraints, the relationships among data, procedures and so on. To do this we have to establish a common understanding of terms, represent the information in an accessible, understandable and useful format and validate the results of the analysis.

Each of these activities, although generically analysis, is best supported by a subset of the available structured techniques. Data flow diagramming is useful for describing procedures, but that's not all of analysis.

Tools, Not Results

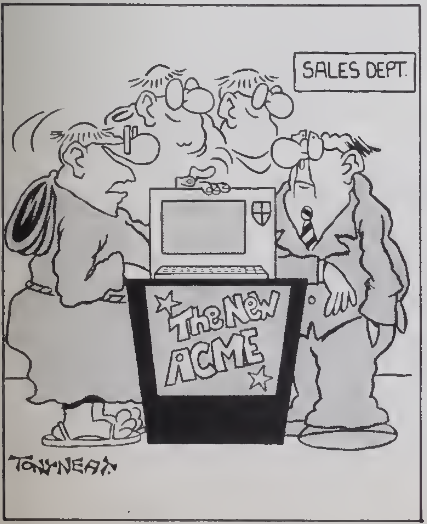
One last point. Structured techniques — okay, methods — are not an end in themselves. They cannot replace intelligence. They are tools to be applied as the situation warrants. The choice should only be constrained by your environment and your objectives.

Although the techniques can be used beneficially on an individual basis, they are considerably more effective when applied as a methodology — an integrated body of tools and techniques and guidelines for applying them. A structured methodology will provide a place to start, a place to get to and the means for getting there.

And methodologies are more effective when used in complement across the system life cycle. It is naive to evaluate structured methods as good or bad based on isolated application — say as in the case of a structured programming methodology.

Using a structured analysis methodology to develop functional requirement and data relationship models provides the context for the design phase. Using a structured design methodology to devise a functional program design provides the context for the programming phase. And the system is implemented using a structured programming methodology. The cumulative effect of the application of these methodologies is worth some rigorous evaluation.

Bevilacqua is technical manager at The Structured Technologies Group in Boston.



'Do You Have One Without a Curser?'

READER COMMENTARY/H.R. Sides

Once Was Enough

God help me, I once used an ALTER statement. Oh, I was young and naive, but I was learning to code in Cobol (on the job from an IBM manual) and I wanted to learn all I could about the beast.

Using an ALTER seemed a good way to do something, but I don't remember what. Maybe to print a page heading before detail processing? Sounds right. I was too green to PERFORM PAGE-HEADING in my mainline routine, if I even had such a thing.

Then came the eye-opener.

One day my boss called me in: "We have a program that went into production a week ago and has just been thrown back. Tell me what's wrong."

Great. I must have written all of one and a half read-prints by then. The source listing was a few inches thick. No comments. No other documentation.

Well, I soon decided that the only (slim) hope I had of deciphering the program was to flowchart the Procedure Division. A few weeks later, I had covered two walls of a conference room with a flowchart on those big desk pads we've all used — three to four rows deep.

One whole page was filled with home plate symbols, branches from an ALTERed GOTO!

I realized that I still didn't have a clue, so I got help. A few days later, a senior programmer agreed: We didn't have a clue.

We reported back to our manager: "Boss, we don't know what's wrong. As a matter of fact, we can't find anything that's right. There are, however, one or two things that don't seem to be kosher Cobol, so we plan to change them, recompile and pray.

We did. It worked. We never saw the program again, and I've never since used an ALTER.

Sides is a senior systems analyst with Harris Semiconductor Corp. in Melbourne, Fla.

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Contrary of Industry Sentiment

IBM Found Not Inclined to 'Star' Nets

By Ronald G. Ross
Special to CW

PRINCETON, N.J. — Among many DP professionals, the idea of IBM favoring a hierarchical or star configuration for computer networks is almost a reflex with other vendors thought to favor ring or peer networks. In spite of this prevailing sentiment, no evidence exists within any of IBM's current IMS data base products to support that view.

What would be required to support a hierarchical network of distributed data base systems? A special master directory would have to exist at the top node of the network. This directory would resolve any locational questions that nodes below the top one were unable to handle. It would also probably be used to coordinate copies of data that might be replicated at nodes below it. Network-wide security could be another function of this directory

IBM's major IMS-related facilities for supporting distributed data processing (DDP) include Multiple Systems Coupling (MSC) for IMS Data Base/Data Communications (DB/DC) systems and Inter-Systems Communications (ISC) for CICS/DL/1. Neither of these contains such a specialized master directory.

In each of these environments, the individual IMS DB/DC or CICS/DL/1 system has its own directory. This directory is established when the system is generated and contains sufficient information to control the routing of transactions (MSC) or the shipping of processing functions (ISC). Such transactions or function requests are issued by local application programs needing access to remote data bases.

Where has IBM been and where is it going in terms of distributed data bases? Ross reviews the current IBM offerings for a distributed environment.

At the remote computer the local directory may or may not be significantly involved in getting the results back to the original machine. Actually, in ISC in particular, some very important capabilities are only partially controlled by the directory on either machine.

A review of the directory function in an IBM data base network, therefore, reveals a collection of local directories, each of which has sufficient information to route transactions or processing requests to other data base systems as required. The contents of these local directories are not coordinated in any global sense and there is no hierarchical precedence among them. While it is tempting to view such a configuration as a peer network, this would be misleading because none of the receiving nodes knows where else to send transactions that cannot be satisfied locally.

Why is IBM so often identified with hierarchical networks? The answer must lie with its system network architecture (SNA) and other master strategies for data communications.

These communication strategies have little or nothing to do with data base facilities directly, especially with those currently in existence. If one views networking facilities as separate layers, then SNA falls below the level at which MSC and ISC operate.

Commercial DDP capabilities are still in a relatively primitive state — and that applies

(Continued on Page 44)

ISR Cobol Program Generator Designed for DEC PDP-11s

CORAOPOLIS, Pa. — Information and Systems Research, Inc. (ISR) here introduced a Cobol program generator for Digital Equipment Corp. PDP-11 computers.

Identical in concept and function to ISR's Dibol/DBL and Basic-Plus generators, the firm began package development of its Cobol versions of Rims/MPG based on a Cobol program generator that was compatible with the 1974 American National Standards Institute (Ansi) standards.

ISR "modified it [the Cobol-74 generator] as necessary to accomodate the specific Cobol languages and I/O structures . . . offered by both DC and S&H Computers, Inc.," according to Charles J. Noll, research and development specialist. The S&H compiler also operates on the DEC PDP-11, ISR noted.

The firm's goal is a Cobol language that "ignores" special features of each individual manufacturer's operating system. Future plans include testing the generator on various CPUs to ensure portability, a spokesman said.

In fact, the company hopes to announce results for other CPUs "within the next few weeks . . . if all goes according to schedule," according to Richard L. Roth, executive vice-president.

Claiming that it can now provide a Cobol program "for the entire spectrum of DEC PDP-11 systems, ISR offers its RSTS/E (CTS-500) version at the upper end of the spectrum and covers the low end with its RT-11 (CTS-300) version, Noll said. This range is said to be particularly helpful to the DEC user who is moving back and forth between operating systems.

Rims/MPG allows the user to create and maintain data files, automatically generate data entry screens, sort data elements within files, create final reports from those files and merge data elements from various files, ISR said.

Available immediately on both an OEM and end-user basis, ISR is offering both multiple and single CPU licenses. Typical single CPU license fees are $11,250 for an OEM and $7,500 for an end user, ISR said from its headquarters at 410 Rouser Road, Coraopolis, Pa. 15108.

'DA1' Offers FBA Support For 4300 Series

OMAHA, Neb. — Fixed-block architecture (FBA) support for IBM 4300 series computers is available with DA1, a data base management system developed by Consolidated Business Systems, Inc.

The FBA support is available with DA1 for IBM DOS/VSE commercial installations. DA1 also runs with IBM DOS and DOS/VS under count key data. DA1's Data Definition Language allows fields to be defined in a hierarchical manner. Data is independent from the field level and the Data Manipulation Language accepts a set of calls from a host language, such as Cobol.

DA1 can support inverted, direct and sequential data structures without requiring IBM's Vsam or emulation of non-FBA disk devices, the vendor said. Options include multitasking support, multiple partition support and logging.

Utilities include high-speed load and unload programs. Interfaces to CICS, Westi and Minicomm teleprocessing monitors are provided with DA1, which requires 12K bytes of main memory, plus the user's buffer table space.

A perpetual license for DA1 costs $16,750. The vendor can be reached through P.O. Box 6183, Omaha, Neb. 68106.

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Attendees to Get Lease Discounts

ANDOVER, Mass. — A series of free software seminars, which entitle participants to receive software lease discounts, will be given by Software International in 48 U.S. and Canadian cities beginnng March 10.

The one-day seminars were designed to show how a company can close books on time, provide on-line financial information and control cash flow for maximum profitability, the vendor said.

Participants will receive a certificate, which entitles the holder to a $1,000 discount on any of the company's financial systems, the vendor said.

Information on the seminars is available from Software International, Elm Square, Andover, Mass. 01810.

Account System Fits PE Users

MIAMI — A business management and accounting software system designed to run on Perkin-Elmer Corp. 32-bit series computers is available from Computerman, Inc.

The system handles order entry, inventory, shipping, cost accounting and profit and loss analysis for medium to large manufacturers with no dependence on paper filing, the vendor claimed.

The accounting package includes accounts receivable, voucher register/purchase journal, cash disbursements, accounts payable and general ledger comparative financial statements.

The system costs approximately $40,000, the vendor said from 4470 S.W. 74th Ave., Miami, Fla. 33155

HP Adds Financial Features To 'Materials Management'

PALO ALTO, Calif. — Financial capabilities and European-language versions for its Materials Management/3000 application software product have been announced by Hewlett-Packard Co.

Financial Interface is a set of programs and procedures that can be used to transfer records of inventory movement activity into costed journal entries, which in turn can be accessed by a conventional general-ledger software package for further processing.

According to the vendor, the new financial capabilities will help manufacturers integrate the materials planning and control features of HP Materials Management/3000 with existing or new financial software.

Included as part of the standard Materials Management/3000 package, the Financial Interface is being distributed free of charge to current users of the system, HP said. Otherwise, the U.S. price of each version of the Materials Management/3000 software, with the Financial Interface, is $30,000. Discount schedules apply and maintenance costs $320 per month, the vendor said from 1507 Page Mill Road, Palo Alto, Calif. 94304.

Harris to Cut Prices at Meet

MILWAUKEE — Harris Data Service, Inc. is offering its two publishing software packages [CW, Jan. 12] at a 25% discount to those who attend a seminar/demonstration to be held in its Clearwater, Fla., office during March 23-27.

The Distribution Order Processing System and the Subscription Fulfillment System, both of which run on the IBM System/34, are specifically designed for book and magazine publishers, the vendor said.

The 25% discount applies to those who attend the seminar for one day and will reduce the cost of the Distribution Order Processing System from $12,500 to $9,350 and the Subscription Fulfillment System from $6,500 to $4,875.

The seminar is free and appointments can be made by contacting Harris Data Service, Inc., 11629 W. Dearborn Ave., Milwaukee, Wis. 53226.

IBM Not Inclined To 'Star' Nets

(Continued from Page 43)

to all vendors. Actually, "hierarchical vs. peer" is not a real issue yet in the data base field except in development circles.

It is not possible to discern a direction within the existing IBM offerings. Even in a pure CICS/DL/1 network at the state of the art for existing commercial mainframe data base management system (DBMS)/DDP software, there seem to be no clues.

Ironically, the pure CICS/DL/1 network is somewhat underdeveloped in the directory area. One run-unit interactively communicating with a second, for example, must instruct the DC system where the second is logically situated in the network.

Therefore, much of the visible IBM-distributed data base activity is less than exciting. In fact, the attempt to develop an interface between two already existing noncompatible DC environments would hardly be worthy of any notice if not for the possibility of establishing communications between 4300 systems with CICS and central 370s with IMS/DB/DC.

Ross is editor of the Data Base Newsletter. *More information on IBM's distributed data base capabilities is in this month's issue, which may be obtained free from PDC, 1101-N State Road, Princeton, N.J. 08540.*

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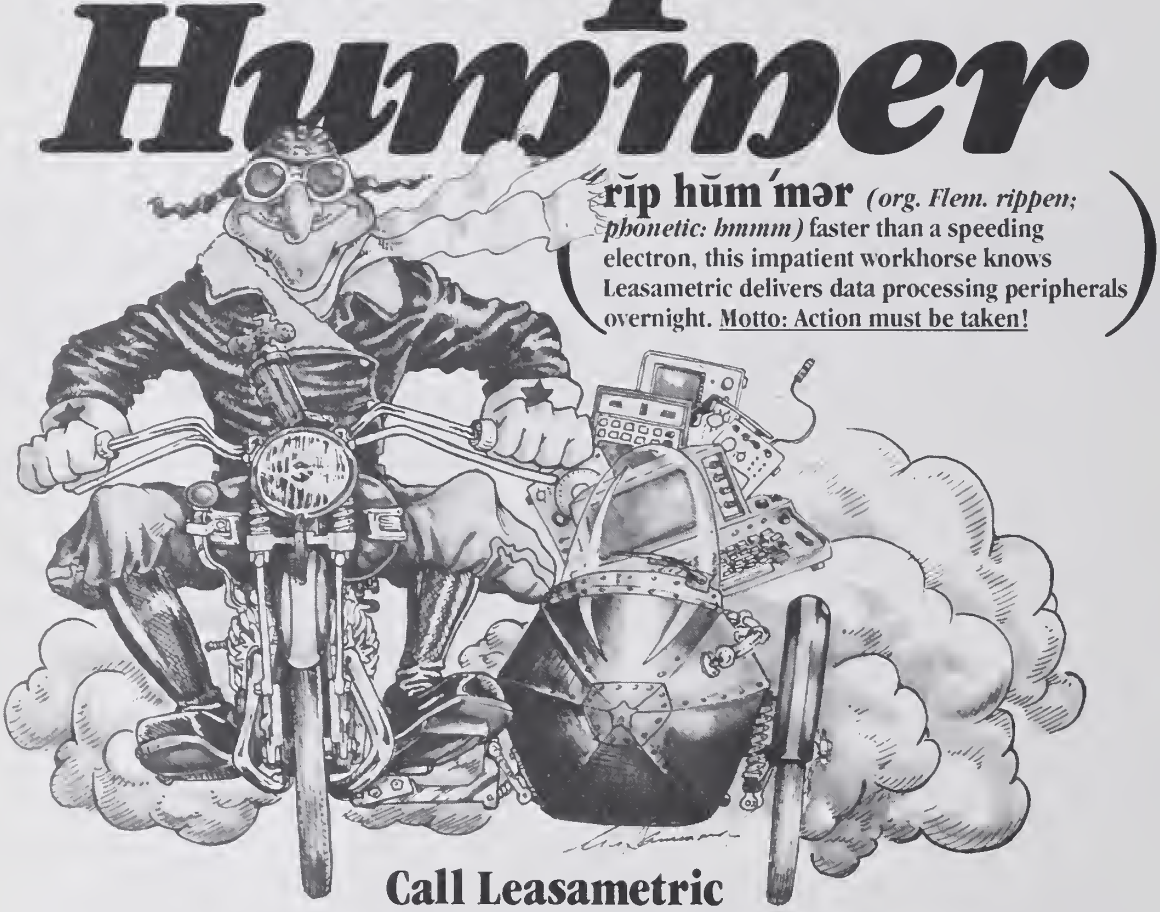

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'Buffer Management Library' Accelerates Prime Fortran

SAN RAFAEL, Calif. — A new version of Fortran I-O Accelerators, a Buffer Management Library for Prime Computer, Inc. systems said to eliminate up to 95% of the processor overhead in binary file operations, is available from Systems Applications, Inc.

Benchmark Increases

The library accelerates transmission rates 20-fold for short logical records and 30-fold for very long records, while showing a numerical benchmark increase from 24,000 to more than 700,000 bytes per CPU second, the vendor claimed.

The Buffer Management Library package is available for $395 from Systems Applications, Inc., 950 Northgate Drive, San Rafael, Calif. 94903.

System/34 Gets Job Scheduler

WOODLAND HILLS, Calif. — A time-dependent job scheduler program for the IBM System/34 has been announced by Info III.

The SmartQ utility allows the DP manager or system operator to control the time when any job is to run. It can be used in a procedure or through a prompting display, the vendor spokesman said.

SmartQ costs $195, including diskette and mailing cost, from Info III at Suite 107, 21250 Califa St., Woodland Hills, Calif. 91367.

Intel Beefs Up System 2000/80

AUSTIN, Texas — Intel Corp.'s Commercial Systems Division has announced an enhancement package for its System 2000/80 data base management system (DBMS).

Key features in Release 10.0 include enhanced recovery with CICS coordination, direct access keys to cut record access time, a CMS multiuser facility and distributed processing support.

Concurrent batch and on-line (CICS) programs can be updating the same data base with data base integrity ensured even if one or both programs fail. The direct access key provides for direct access to data and bypasses all inverted index and structure processing, Intel said.

Release 10.0 introduces a CMS multiuser facility that allows concurrent access to a single data base by production systems utilizing CMS as the terminal monitor. The CMS multiuser facility is available with or without Intel's multithread feature. It does not require OS or DOS operating system support on the VM machine, according to the vendor.

Distributed DBMS processing reportedly requires only a single copy of the System 2000/80 DBMS within the network, and Multiple Systems Coupling (MSC) supports fully coordinated channel-to-channel communications between two or more IBM processors.

A typical price range for System 2000/80 Release 10.0 is $60,000 to $100,000, depending on the number of options selected, the vendor said from 12675 Research Blvd., P.O. Box 9968, Austin, Texas 78766.

DEC Brings Out DSM-11 Update

HUDSON, Mass. — Digital Equipment Corp. is offering an enhanced version of its DSM-11 (Digital Standard Mumps) operating system.

The medically oriented system provides a data management system to operate with all PDP-11 minicomputers and the PDP-11/23 microcomputer, the vendor claimed.

The product is said to increase the number of supported terminals and to provide support for more than one disk type per system.

DEC's Medical Systems Group also announced the availability of the Ansi-standard Mumps language on the VAX-11/780 and VAX-11/750 superminicomputers.

DSM-11 licenses for $17,500; VAX-11 DSM, $12,000; and DSM-11-based systems are priced from $30,099, the vendor said from Maynard, Mass. 01754.

Vsam Support Added to 'IAM'

CLIFTON, N.J. — Innovation Data Processing has announced a V-4.0' no-charge update to its IAM package.

IAM V4.0, a replacement for IBM's Isam/Vsam program products, now supports CICS command level Vsam and Taskmaster Vsam and is transparent for applications using Innovation's Amigos interface, the vendor spokesman said.

The firm is located at 925 Clifton Ave., Clifton, N.J. 07013.

'Score' Offered In On-Line Form

NEW YORK — SDA has announced that Score, its Cobol generator, is now available as an on-line package featuring complete user control, immediate response and turnaround and the elimination of keypunch errors.

Score is reportedly compatible with most hardware, and the on-line enhancement is available from SDA, 475 Park Ave., New York, N.Y. 10016.

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Adaptive Routing. It's not necessary to physically connect every computer to every other computer. This reduces line costs. At the same time, network operations can continue even when communications links break down. Information is automatically rerouted around problem areas.

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Of course, a network can only be as effective as the computers within it. After all, most systems only use their networking capability 20 percent of the time. The real test of any distributed system is the way it does its job.

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To date, Digital has implemented over 5,000 network nodes around the world. And we don't just install them, we support them, too, with an international team of over 14,000 service people.

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BOSTON — The 1981 National Software Conference (NSC) will forsake the traditional booth-covered exhibition floor in favor of an organized series of 50-minute presentations by software vendors when it is held at the Copley Plaza Hotel here June 22-24.

Almost 100 presentations on software products are scheduled for the three days. "Our presentation format is different, and we feel better suited to the prospective software buyer," said George Schussel, the conference chairman.

Both applications software and systems software subjects will be discussed under 10 major product categories including financial administration, manufacturing, banking, insurance, data management, graphics and plotting, communications, development aids, utilities and systems software.

Registration costs $395. More information is available from AMR International, 1370 Ave. of the Americas, New York, N.Y. 10019.

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System/34 Gets Update Of Mail Tool

CLEVELAND — Cosmo Software is offering an enhanced version of its Extended Message System for IBM's System/34.

The enhancement allows two System/34s to be connected via a batch communications link, the vendor spokesman said.

Features of the enhancement include an electronic mail capability between remote sites, the vendor said.

Messages of up to 20 lines with 70 char./line can be transmitted and reviewed by both the sender and receiver, according to the vendor spokesman.

The package costs $200 per CPU, Cosmo said from 3239 W. 14th St., Cleveland, Ohio 44109.

Data Base Indexes Economy

TORONTO — I.P. Sharp Associates is offering the National Planning Association Economic Data Base.

The data base contains more than 180,000 yearly time series of economic data for the U.S.

The data is broken down by county, state, region, Bureau of Economic Analysis economic area and standard metropolitan statistical area. In all, there are over 3,600 areas, the vendor spokesman claimed.

Each area has 50 items covering employment, income, earnings and population. Country totals are also included.

Charges for use of the data base depend on computer time used.

I.P. Sharp Associates is located at 1200 First Federal Plaza, Rochester, N.Y. 14614.

Firm Slates Free Seminars On Finances

ANDOVER, Mass. — Software International Corp. has announced a series of free seminars aimed at demonstrating how a company can improve its financial systems.

The seminars also qualify attendees to receive up to $5,000 in savings on Software International products, the firm said.

More information on the one-day seminars is available from Software International Corp. at Elm Square, Andover, Mass. 01810.

Packages Support Layout Documentation

COSTA MESA, Calif. — Applied Business Systems has unveiled two software documentation support packages, Report-DEF and Screen-DEF.

Report-DEF is designed to help system analysts and programmers prepare report layout documentation. It can be used by OEMs, software houses and organizations involved in the development, modification and support of software.

It will run on any 64K-byte Data General Corp. Nova or Eclipse minicomputer with disk, CRT terminal and printer running under Rdos, the vendor claimed; it costs $750.

Screen-DEF is used by systems analysts and programmers to prepare screen layout documentation. It allows users, via a CRT terminal, to enter parameters that describe how a screen layout should appear. It runs on the same systems as Report-DEF and also costs $750, the vendor said from Suite B-6, 3303 Harbor Blvd., Costa Mesa, Calif. 92626.

Lockheed Service Covers Congressional Output

SUNNYVALE, Calif. — The Congressional Information Service Index (CIS), covering committee publications and legislation produced by the U.S. Congress since 1970, is available now through the Dialog service of Lockheed Missiles and Space Co., Inc.

Users of CIS will be able to access public policy studies, committee hearings and legislative reports, as well as trace the history of a law or locate testimony in seconds, the vendor claimed.

The data base, updated monthly, is available by direct-dial to Lockheed's computers at an hourly search fee of $90.

Lockheed Missiles and Space Co., Dialog Marketing Department is located at 3460 Hillview Ave., Palo Alto, Calif. 94304.

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Additions to 'Manage' Include High-Level Report Generator

EL SEGUNDO, Calif. — Computer Sciences Corp. has announced an enhancement to its Manage data base management system that features a high-level report generator, a data manipulation language that generates Cobol-executable code and on-line documentation.

Available via the worldwide Infonet teleprocessing network, the enhanced data manipulation language consists of highlevel Cobol calls to access Manage data bases. Advanced capabilities of the new report generator include multiple reports in a single pass, comprehensive and flexibile field editing, a range of foreign and domestic data and currency formats, format control and subroutine calls, the vendor claimed.

The data base management system with enhancements is available immediately at Infonet's regular teleprocessing rates from Computer Sciences Corp., 650 N. Sepulveda Blvd., El Segundo, Calif. 90245.

'Dbsort' Runs Macro Sort For DEC CTS 300 Users

BILLINGS, Mont. — Computers Unlimited has unveiled a software system for users of Digital Equipment Corp.'s CTS 300 operating system than can run a high-speed Macro sort under Timeshare Dibol.

Dbsort is available to OEMs or distributors on a discount basis or to end users for $300.

Computers Unlimited may be contacted through P.O. Box 353, Billings, Mont. 59103.

Series/1 Users Offered PXS Vtoc, Newsletter

LUDLOW, Mass. — Computer Technologies, Inc. is offering a disk catalog (Vtoc) for PXS files and a free newsletter for the IBM Series/1 user.

The application features the ability to list PXS files in alphabetical order, a format date printing feature and a record count mode. The package costs $1,000.

The firm is also offering free subscriptions to its EDX/PXS newsletter, which is said to offer tips and sample subroutines for the Series/1 user.

Computer Technologies, Inc. can be reached through P.O. Box 259, Ludlow, Mass. 01056.

'Aims' Supports Inventory Jobs On System/34

SAN FRANCISCO — NMG Systems, Inc. is offering an accounting and inventory management package for IBM System/34 users.

Called Aims, the package features inventory management and control, commission reporting and order entry, the vendor said.

Aims costs $14,000 complete or can be split into inventory and accounting modules priced at $9,750 and $6,000 respectively. NMG is at Suite 990, 220 Montgomery St., San Francisco, Calif. 94104.

'Aide' Measures Data Entry Work

HORSHAM, Pa. — Standards Co. is offering a Cobol work measurement system for data entry.

Features of Accountability in Data Entry (Aide) include monitoring of records processed per hour and keystrokes per hour.

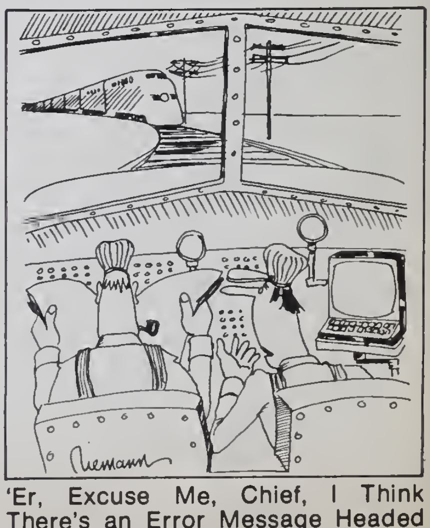
The package costs $18,750, the vendor said from 589 Colonial Drive, Horsham, Pa. 19044.

Package Backs Data Managers

ARLINGTON, Mass. — Micro Architect, Inc. has announced IDM-C1, one of a series of interactive data base managers.

The basic components of the package are a data base initialization program, a data base manipulation program, a report writer and a report generator.

IDM-C1 costs $159. Micro Architect is at 96 Dothan St., Arlington, Mass. 02174.



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But Wang VS systems aren't just powerful computers. They're complete systems that make computer power ingeniously easy to use. Our programming aids, for example, let you create a data entry screen as easily as writing a word processing document. Our Symbolic Debug utility lets you test and modify COBOL, BASIC, RPG II and Assembler programs at the source level. And our menu-driven file management facilities let you set up files, process transactions, generate reports and establish field-level security controls — interactively.

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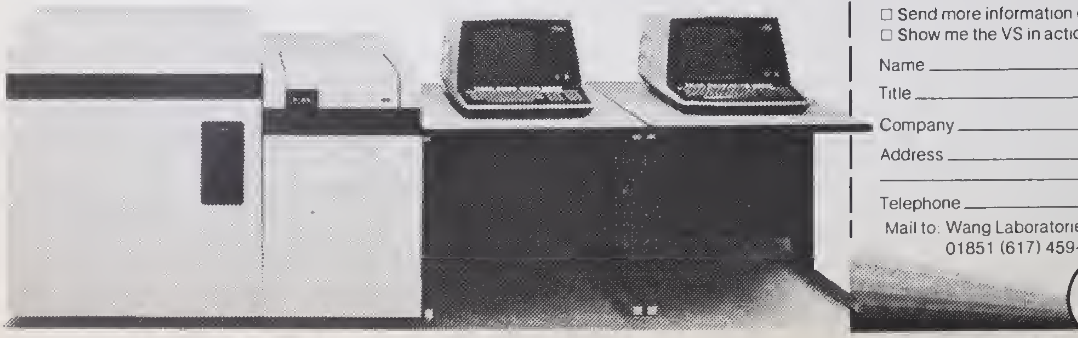

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Richard Nolan, President
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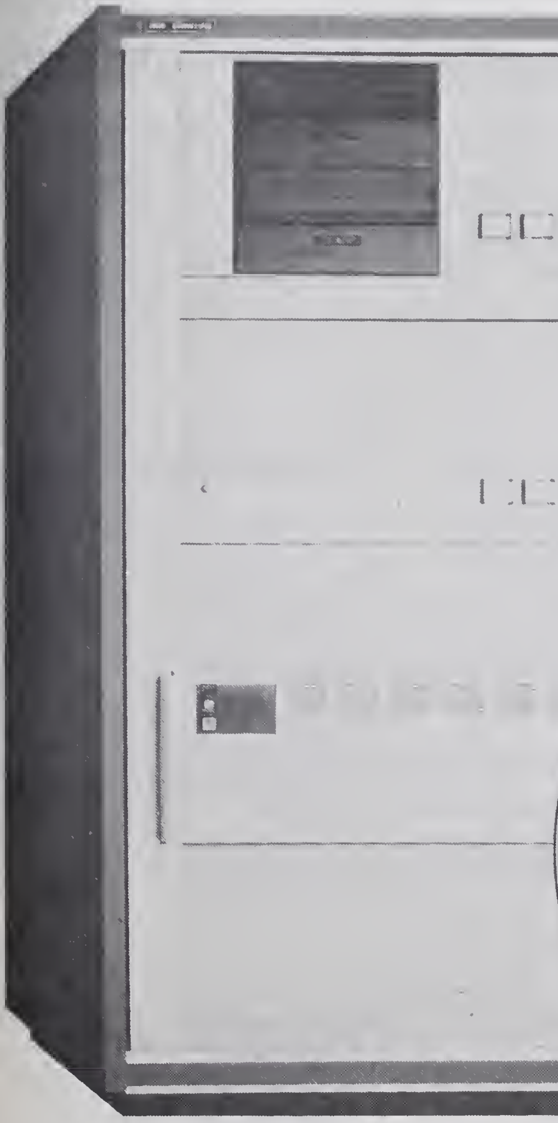

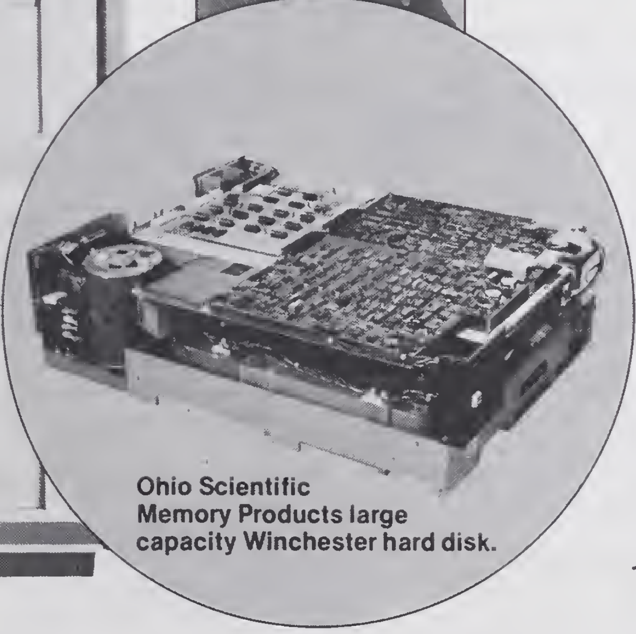

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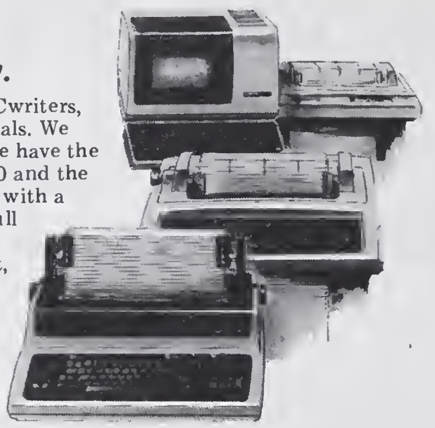

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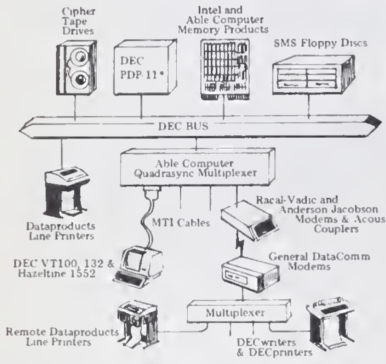
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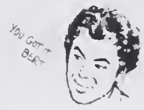

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Genesee Computer Users Get Engineering Programs

ROCHESTER, N.Y. — Four engineering programs with applications in building energy use analysis, design of heating and cooling systems and building structural analysis are available from Genesee Computer Center, Inc.

The programs include pipe network analysis, domestic water demand, selection of air diffusers for heating and cooling systems and a cost risk estimating program applicable to engineering management decisions, the vendor said.

The four programs are available on Control Data Corp.'s Cybernet network to Genesee system users and are priced depending on the size of programs run from Genesee Computer Center, Inc., 20 University Ave., Rochester, N.Y. 14605.

Simplified Report Generator Joins Comshare's 'Questor'

ANN ARBOR, Mich. — Requestor, a simplified reporting capability, has been added to the Questor data base management system offered by Comshare, Inc.

According to the vendor, Requestor helps users with little or no computer experience to create reports from information contained on their data bases. By responding to prompts, users can instruct Requestor to create reports ranging from simple listings to statistical analysis. Requestor can be customized to "converse" in language familiar to the user's discipline, the vendor said.

One-day training seminars to teach clients to install, use and maintain Requestor are available in each of Comshare's 16 U.S. offices. Requestor is available on a time-share basis and is transaction-priced, the vendor said from 3001 S. State St., Ann Arbor, Mich. 48106.

Remote Computing's SLP Update Allows Simple Interest Calculation

PALO ALTO, Calif. — Remote Computing Corp. has announced the SLP-14B enhancement which reportedly allows users of the SLP time-sharing operating system to compute simple interest on over 10 types of consumer loans.

The SLP-14B also allows the user to forecast savings portfolio yields and calculate interest on accrual accounts, the vendor claimed. Noncash returns on subsidiary investments can also be computed on the SLP-14B, the vendor said.

There is no additional charge for the enhancement to SLP system users.

Remote Computing Corp. is headquartered at 1076 E. Meadow Circle, Palo Alto, Calif. 94303.

Cybernet Gets Pile Analysis

MINNEAPOLIS, Minn. — Control Data Corp. has added a three-dimensional pile group analysis program to its Cybernet Services Civil Engineering Library for the construction industry.

Cybernet is a worldwide DP network.

The pile group program is billed on an as-used basis. The firm may be reached through Box O, Minneapolis, Minn. 55440.

GraphicsPackage Gains Subroutine

BOULDER, Colo. — Precision Visuals, Inc. has announced DI-3000 Charts and Graphs, a business graphics subroutine built upon the firm's DI-3000 Core-based graphics package.

Features include full-color, graphics arts quality annotation, legends and linear axes.

The package costs $4,000, the vendor said from 250 Arapahoe, Boulder, Colo. 80302.

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China Computerworld is a joint venture of the Fourth Ministry of Machine Building and CW Communications/Inc. and it includes among its 25,000 subscribers the key government officials and computer managers who have EDP purchase decision authority.

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Computer Inquiry II Decision Premature

By Phil Hirsch
CW Washington Bureau

Analysis

WASHINGTON, D.C. — It is becoming increasingly obvious that the Federal Communications Commission (FCC) was too optimistic last December when it issued a "final" decision in the Second Computer Inquiry.

The following month, the National Telecommunications and Information Administration (NTIA) recommended that the commission require enhanced services and competitive products to be manufactured by the separate subsidiary organization which the decision establishes. NTIA also said the "separate sub" should perform all of the related research and development work.

The FCC decision, as issued, requires only that marketing, together with R&D of application software, must be performed separately.

Last month, two more proposals for altering the computer inquiry decision were submitted to the FCC. One came from AT&T, the other from the Independent Data Communications Manufacturers Association (IDCMA), which represents the nation's major modem makers.

Bell objected to a provision in the decision which would allow terminal equipment put in service after March 1, 1982 to be offered on a nontariffed, deregulated basis. Already-installed terminals (which the commission refers to as customer promise equipment or CPE) would remain regulated in most cases until a number of "transitional issues" — such as the prices at which this equipment will be sold by each operating company to its new, separated subsidiary — are decided.

The FCC's scheme "simply will not work," AT&T said. "It will create even greater problems than it was intended to solve."

(Continued on Page 54)

Preserves Central Site Integrity

Parallelism Strategy Eases DDP Switch

By Michael G. Ritchay
Special to CW

Distributed data processing (DDP) can only be developed slowly within the environment of an IBM-type host because the user has an inadequate number of safe ways to approach the process.

By "safe" is meant four things. First, assured central control. Second, value-added benefits at a very low cost. Third, no required change in existing host applications programs.

And fourth, demonstrated vendor capability to support a DDP offload in depth. Depth in this case means product adequacy, personnel support adequacy, compatibility adequacy, field service adequacy and vendor credibility adequacy.

Without conviction that all of these elements will be solidly in place, a user would face obvious risks in charging ahead with a DDP effort.

There is today, however, a strategy that a user can follow to initiate entry into potentially powerful DDP programs while preserving central-site integrity, operations and control.

At Raytheon Data Systems Co., we call the strategy "parallelism." It means, quite simply, the process of bringing distributed processing functionality into a user's data networks by introducing — in gradual steps — a series of DDP capabilities in existing applications with no change whatever in current staffing, operations, programming or communications.

A strategy for implementing distributed processing networks known as "parallelism" resolves certain problems of remote job entry in IBM-type environments, the author maintains in this first part of a two-part series.

The strategy involves merely a swap-out of existing equipment performing a given task with new equipment that can immediately perform it better, faster and cheaper.

Implicit in the concept of swap-out is the ability to swap back in. That is, if the DDP equipment does not perform as required for a particular application, the user can just as easily revert to his prior equipment and mode of operation.

This capability alone assures significant lack of risk. But the real question is: Where would the new DDP equipment fit in an existing IBM-like network without risk?

(Continued on Page 58)

Two Dot Matrix Printers Expand TI's Omni 800 Series

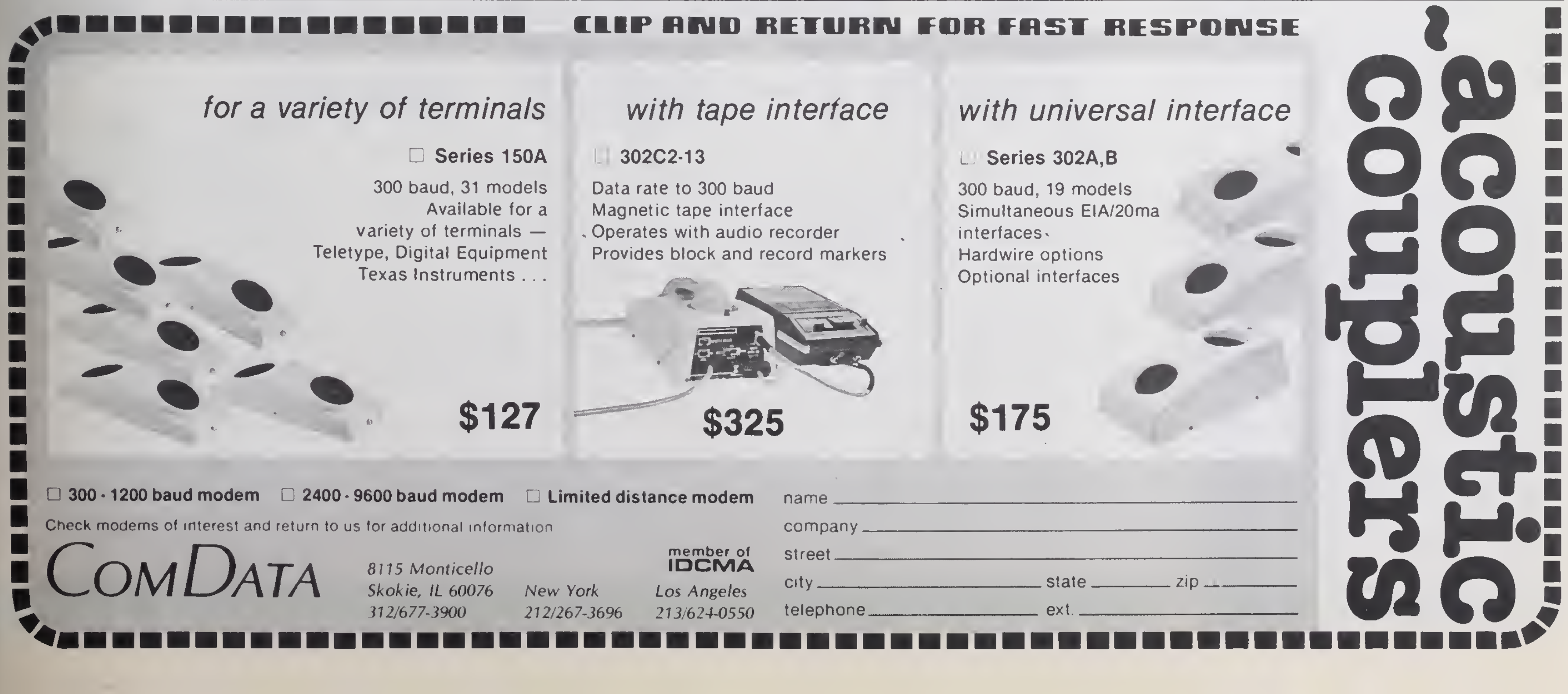
HOUSTON — Texas Instruments, Inc. has expanded its Omni 800 series of data terminals with the addition of two low-speed, serial dot matrix models which the company said combine 75 char./sec printing speed with a range of options.

The Model 840 Keyboard Send-Receive (KSR) and the Model 840 Receive-Only (RO) printers are impact printing terminals engineered for future expansion with modular exchangeable parts, the vendor claimed. Most mechanical and electrical assemblies are interchangeable between the two.

Both models feature a full Ascii character set, 33 control character print symbols, snap-in ribbon cartridge and an operator-programmable answerback memory capable of storing up to 32 characters in nonvolatile memory, the vendor claimed.

Options include high-speed data transmission of 1,200 to 9,600 bit/sec with an additional 2,000 character first-in, first out buffer, the vendor said.

Both the 840 KSR and 840 RO will be available in the second quarter of 1981, with the KSR priced at $1,345 and the RO priced at $1,195 from TI, P.O. Box 202145 H-566, Dallas, Texas 75220.



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Second Computer Inquiry Decision Premature

(Continued from Page 53)

The phone company insisted that "bifurcation" will make life unnecessarily difficult for the terminal user. If he wants to add a new telephone terminal to an existing PBX, for example, he will have to deal with both the operating company and the subsidiary. If bugs develop afterward, it may be difficult to determine which organization's equipment is at fault.

And because of "the duplication of customer contact personnel and facilities and the additional recordkeeping . . . entailed by bifurcation, the commission would be mandating the incurrence of, at a minimum, hundreds of millions of dollars of additional costs that otherwise would not have to be increased," AT&T said.

Bell suggested, instead, that the commission detariff *all* CPE on March 1, 1982 "or shortly thereafter." It admitted that the transitional issues will have to be settled first, but added that "these issues seem amenable to resolution in time to implement this decision" by the March 1, 1982 deadline.

Change of Heart

Strangely, AT&T expressed much different views last year, when the commission's initial decision in the Second Computer Inquiry was issued. That decision proposed detariffing all CPE on March 1, 1982 — i.e., exactly what the phone company is now asking for.

Last year, however, AT&T said that "implementation of the commission's structural separation scheme will be a substantial task," adding that "it is not now clear, given the numerous considerations and decisions required, precisely in what time frame the organization changes can be accomplished."

Subsequently, and partly in response to AT&T's statement, the commission decided on the present bifurcated plan, pointing out that "the difficult transitional issues arise not in connection with the provision of new CPE but in connection with . . . adjustments to existing arrangements involving . . . embedded (already-installed) equipment."

There is at least a possibility, however, that AT&T's change of heart may be more apparent than real.

A spokesman for the independent modem makers argues that "Ma Bell knows the 'transitional issues' can't be settled by March 1, 1982. AT&T is really saying, in its latest statement, that the commission should delay the detariffing of *all* CPE until those issues are settled, which is the argument they have been pushing for some time. Notice that last month they stated that 'if . . . the commission decides . . . more time is needed to implement full detariffing, a slight delay may be necessary for all Bell System CPE.' "

If this observation is correct, it means AT&T is trying to erase a key change wrought by the computer inquiry decision.

Last April, in the first version of its "final decision," the commission said "the degree to which innovation occurs independent of the telecommunications network . . . reflects the fact that CPE is clearly severable from the underlying utility service to which it is attached. There is nothing inherent in any carrier-provided CPE . . . that necessitates its provision as an integrated part of a carrier's regulated transmission service."

While AT&T is apparently working one side of the street, IDCMA is working the other. The association, which was in the forefront of the fight to transfer CPE to the separate sub, has, in its latest petition to the commission, tried to separate telephone operating companies even more from the terminal equipment business. The association wants to eliminate "several cryptic and ambiguous passages" in last December's decision which "could be interpreted to permit joint marketing, installation or maintenance of customer premise equipment."

There is, however, a "viable and easily implementable" solution to this problem, IDCMA added. "The commission can permit a manufacturer to perform installation and maintenance functions *and* simultaneously avoid serious anticompetitive problems by extending structural separation to manufacturing functions."

NTIA, in the petition it submitted to the commission last January, made essentially the same recommendation, although for somewhat different reasons. AT&T, however, strongly opposes the transfer of terminal manufacturing to the separate sub, as it made clear in the many months of argument that led up to the "final" decision.

All of which suggests that the whole issue will now have to be debated all over again.

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"The FAST-3805 reduces paging overhead and increases paging capacity. It's an economical solution for extending current CPU resources."

Increases productivity

"You realize the value of the FAST-3805 when you take it off-line, which we did accidentally one day. That's when we discovered that our 4341 by itself supported only 25 active users. The FAST-3805 enabled us to double the number of active users on our 4341 at less than half the cost of a new processor. And not only that, those users were more productive because they got more consistent and faster response times.

"We found the FAST-3805 eliminated both the evident

True Port Concentrator Fits IBM 3270 Protocol

LOS ALTOS, Calif. — A True Port Concentrator designed expressly for IBM 3270 protocol enabling users to employ a variety of terminals is available from Kaufman Research Manufacturing, Inc.

The Model 870 interfaces with a mix of Ascii devices, including hard copy, CRT terminals and minicomputers operating at speeds independent of one another and in turn independent of the communication line speed, the vendor said.

The concentrator also enables users to employ hard-copy printers either as interactive terminals or as printers, the vendor claimed. Communication with the IBM system is bisynchronous at speeds up to 19.2K bit/sec.

Supplied with one line-interface module, the Model 870 is priced at $4,765 with delivery in 60 to 90 days from Kaufman Research Manufacturing, Inc., 14100 Donelson Place, Los Altos, Calif. 94022.

Agile Reduces Price On LC-36 Interface

SUNNYVALE, Calif. — Agile Corp. has announced a 33% price decrease effective immediately on its LC-36 microprocessor-controlled protocol translator and line speed converter for Burroughs Corp. systems.

The LC-36 price is $995. It is available from Agile Corp., 1050 Stewart Drive, Sunnyvale, Calif. 94086.

Datalynx Makes Ascii Units, Minis Run With IBM Host

TORRANCE, Calif. — A protocol convertor designed to make Ascii terminals and minicomputers compatible with an IBM binary synchronous host, while simultaneously providing input, output and logic functions of bisynchronous systems, is available from Local Data.

The Datalynx protocol converter has three input/output ports supported by an 8085A microprocessor and five random-access memory (RAM) input/output buffers. This logic and storage capability provides or exceeds operating advantages normally found in more complex peripherals such as IBM 3780, 2780, 2770 or 3741 terminals, the vendor claimed.

One port is dedicated to the bisynchronous communications. The second input/output port can also support an operator console or a high-speed input/output device such as a minicomputer. The third can drive a second asynchronous terminal, including a printer, up to 600 line/min.

The product offers a choice of dedicated, dial-up or auto-answer modes for remote use.

The five input/output buffers, which provide a total of up to 2.6K bytes of memory, provide fully optimized overlapping of all input/output functions, the spokesman said. This allows an attached printer to operate at its full throughput potential. At 9,600 bit/sec, a 600 line/min printer can be operating at full speed.

The product costs $1,750 from Local Data at 2701 Toledo St., Torrance, Calif. 90503.

Comdata Unveils Phone/Modem

MORTON GROVE, Ill. — Comdata has unveiled a combination telephone/modem designed to provide an originate mode Bell-103/113-compatible 300 bit/sec modem combined with a push-button dial telephone.

The Model 370E2-12 Phonem performs automatic answering and disconnect of data calls. Its voice/data modes are controlled automatically by lifting or replacing the telephone headset, the vendor claimed.

Automatic redial of last number is accomplished by pressing the "#" key. Disconnect is accomplished manually by pressing the "*" key or automatically via last carrier.

The price of the originate-only model 370E2-12 is $277 and the originate/auto answer model 370E2-42, $327, the vendor said from 7900 Nagle Ave., Morton Grove, Ill. 60053.

page wait and the page wait that masquerades as I/O wait. And by reducing the paging load, the FAST-3805 reduced the device, controller and channel contention. The result was more users who are more satisfied. And that's our objective as a data processing organization."

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"Not only did the FAST-3805 take the place of two 2305s and a 2835 controller at Waterloo, but it helped us avoid the purchase of another 2835/2305 system. With the FAST-3805's increased capacity, we were able to stay within our budget . . . and still meet the increased needs of our users.

"In summary, Waterloo got more capacity, better performance and better reliability for less money with Intel's FAST-3805 semiconductor disk."

If you are interested in learning how the FAST-3805 can unleash your system resources and increase your personnel and system productivity, contact Intel's Marketing Information Office at 512/258-5171 or clip and mail the coupon below.

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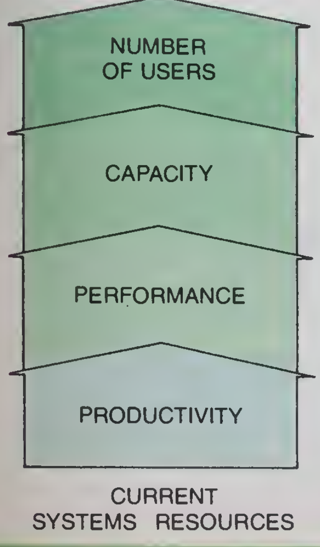
*Native Mode and 2305-emulation are two personalities of the FAST-3805 currently available.



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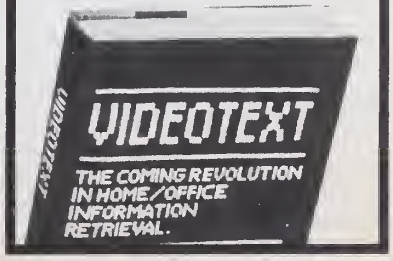

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Terminals Give Dual Protocols, Dual Access

SAN JOSE, Calif. — ECS Microsystems, Inc. has introduced dual-protocol information terminals that directly access two mainframes and can be configured into concantenated local networks.

The ECS 4000 dual protocol series gives end users transparent keyboard access to selected Burroughs Corp., NCR Corp., Sperry Univac and IBM mainframes, a spokesman said.

Data base management capability is reportedly broadened because a single ECS 4000 dual protocol information station can access two mainframes under the same protocol, where two user addresses are involved, or under two different protocols for different mainframe types.

Currently available ECS 4000 dual protocol capabilities include Burroughs TD 830, NCR 796-501, and Honeywell, Inc. VIP 7700 and 7801 emulations, as well as VT 52-compatible teletypewriter.

The ECS terminal provides all the services normally associated with each mainframe terminal type being emulated, as well as supporting a printer, he added.

The dual protocol capability is achieved with ECS' Universal Protocol cards. Using ECS protocol emulation packages, each card is configured to the required protocol. The card also contains firmware and I/O facilities, the spokesman said.

Instant keyboard protocol selection is achieved with an executive programmable read-only memory (Prom), he noted.

The ECS 4000 dual protocol terminal is priced at $4300 in single units, with volume discounts available. Included in the price are the ECS 4000 Information Station, two Universal Protocol Cards, interface cards, and the executive Prom.

ECS Microsystems is located at 215 Devcon Drive, San Jose, Calif. 95136.

Halcyon Offers Data Monitor

SAN JOSE, Calif. — Halcyon Communications, Inc. has developed a data monitor that automatically detects line configuration, even when DCE and DTE speeds are different.

Standard features of the 801 Mini Fox include on-line, full-duplex data monitoring from 50 bit/sec to 19.2K bit/sec; a 512-char., 5-in. CRT display; normal, reverse and dim video capability; a 16K capture buffer; status indicators for EIA leads; start/stop trappings; and automatic error flagging, the vendor said.

The portable 801 weighs 22 lb and occupies less than .66 cu.ft. Setup involves plugging the monitor into the RS232-C interface.

The Mini Fox handles most standard protocols (Async, Bisync, SDLC/HDLC, Transparent Text) and codes (Ascii, Ebcdic, BCD, Baudot) plus a user-selected protocol and codes, according to the vendor. It costs $3,495 from Halycon at 1 Halcyon Plaza, 2121 Zanker Road, San Jose, Calif. 95131.

For Hosts on VIP 7760 Protocol

Harris 1670/Honeywell Debuts for DDP

DALLAS — Harris Corp.'s Data Communications Division has released a communications enhancement for its 1670 distributed data processing (DDP) system.

Designated the 1670/Honeywell, the enhancement provides interactive communications between the Harris 1670 distributed system and Honeywell, Inc.'s host systems supporting the VIP 7760 communications protocol, according to the vendor.

As many as 32 display stations functioning in Honeywell's interactive VIP 7760 mode can be supported by a 1670/Honeywell. Sixteen of these may be switched from on-line host inquiry to on-line inquiry with the 1600 processor. The 1670/Honeywell also offers concurrent batch communications in Honeywell's G115/355 protocol.

With the addition of several hardware and software modules, a current user of a Harris 8760 interactive terminal system, a 1600 remote batch terminal or a 1650 or 1660 DDP system can upgrade to the full-function capabilities of the 1670/Honeywell DDP system, the firm said.

The system, configured with four displays, a 300 line/min printer, 12M-byte disk magnetic tape drive, card reader, remote job entry and interactive communications lines, emulators and Format/10 data entry application software, leases for $2,135 per month, including maintenance for five years. It can be purchased for $97,496, plus maintenance at $499 per month.

The vendor is located at 16001 Dallas Parkway, P.O. Box 400010, Dallas, Texas 75240.

Penril Calling Unit Bell 801-Compatible

ROCKVILLE, Md. — The Data Communications Division of Penril Corp. has announced an FCC-registered Bell 801-compatible calling unit that automatically places a call so that it can be transmitted by a modem.

The Penril Automatic Calling Unit features standard Touch-Tone or pulse dialing. The units cost about $700, the vendor said from 5520 Randolph Road, Rockville, Md. 20852.

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Computer Devices Updates RO Terminal

BURLINGTON, Mass. — A receive-only (RO) data terminal reportedly designed for on-line system applications requiring hard-copy output or to be used as a remote stand-alone printer terminal has been announced by Computer Devices, Inc.

The Miniterm Model 1201 replaces the company's old 1201 and offers as standard a 2K buffer, polling, self-test, a serial interface and selectable 50- to 60 Hz power supply, the vendor said.

Options include high-resolution plotting, answer-back, 4K buffer, 20-mA current loop and 9,600 bit/sec communications, the vendor said.

The standard Model 1201 is available in 60 days and priced at $1,385 with quantity discounts available. Computer Devices is located at 25 North Ave., Burlington, Mass. 01803.

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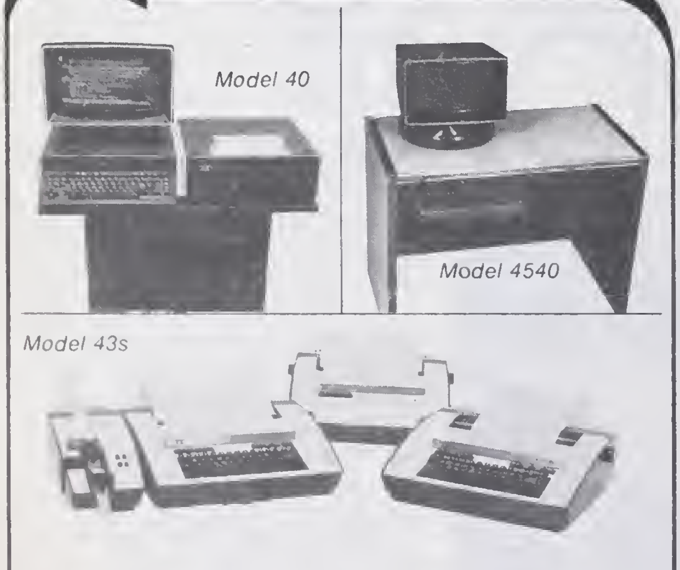

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Parallelism Eases Switch to DDP

(Continued from Page 53)

The answer has two parts that define the very heart of the concept of parallelism.

First, it must fit into those applications currently being performed on-line in which the benefits of the DDP alternative would be immediately observable. This is necessary for reinforcement of user confidence.

Second, it must in fact deliver, without any user discomfort, a significant level of benefit in those applications where operating performance is so well established that changes can be measured precisely. This will allow for quantification of the beneifts of DDP in bread-and-butter applications.

Data Entry Application

Without question, the single largest common application performed on-line by large host users is the data entry function. Dozens, hundreds and sometimes thousands of remote data entry terminals are linked to host mainframes over communications lines to perform this most common of all remote data processing tasks — conversion of source documents to machine-processable form.

The vast percentage of these data entry terminals are controlled as slaves within a host-controlled polled network. They perform little preprocessing, are driven by host-loaded formats, have no local storage facilities and often generate unnecessary cost-labor overheads and high communications costs because of long response time delays.

Although these terminals provide for rapid host capture of vital business information from outlying locations, they also transfer to the host the exclusive responsibility for enormous error detection, editing and data validation. Many large users estimate that 30% to 40% of a host processor's time is spent verifying the accuracy and completeness of data from remote entry terminals.

Another difficulty with such terminals is their lack of adaptability to the various types of data entry functions that a user typically performs. In some cases, the terminals are used in place of batch-oriented key-disk systems in which high keystroke rates and significant data editing is done prior to transmission to the host. The trade-off becomes interactive transmission at the cost of pre-editing.

In other instances, replacement of high-rate keypunching is the goal, with the benefits being transaction vs. batch entry and significant savings on costly paper media. The editing is still done at the host.

Or the data entry terminals are being used in place of multifunction remote job entry systems that might possess printing and tape storage capabilities the terminals cannot match. Or accounting machine techniques that have calculation functions that the terminals do not. Or true source data entry procedures, in which case users with knowledge of the source documents are removed from computer entry by the data entry terminal operators.

These trade-offs of interactivity for functionality have occurred in part because vendors have overlooked the variety of data entry functions required by users. They have either offered lower cost emulator products for the IBM-type terminals or introduced more powerful systems that require significant change in the manner in which a user is operating.

Raytheon Packages

Raytheon, with more than 75,000 terminals in use in data entry applications in the IBM 3270 mode, has itself fallen into this dilemma. Although the company has developed more than 200 customized versions of its data entry terminals to satisfy individual user requirements, it has only been within the past two years that experiments with various data entry solutions have begun to bear fruit.

In the past year, Raytheon has developed a series of data entry program packages, called the Entry 80 series, and — equally important — a hierarchy of low-cost functional controllers than can accommodate one or more of the packages.

Right Combination

The combination of these capabilities, which can be assembled in various configurations to fit precisely the requirements of the user's data entry tasks, are what make parallelism possible. That is, a user can install one of five different controllers, operating with any of four different data entry packages, and immediately convert existing 3270-type data entry clusters into highly productive DDP systems.

The systems can then run under a variety of interactive 3270 or queued batch 2780, 3780, or Hasp protocol modes. No other change, except these upgrades, is required in the user's organization.

Ritchay is director of distributed systems for Raytheon Data Systems Co. in Norwood, Mass.

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How to Evaluate A Data Dictionary

BY JACK E. EWERS

Do you feel embarrassed when someone asks how data dictionary fits into your data management plans?

Do you wish you knew a little more about data dictionary concepts?

Would you like to know how to determine the potential value of a data dictionary system for your shop?

If these questions concern you, you are not alone. Many DP managers face the same problems.

Data dictionary is rapidly becoming an integral part of the data management process, and effective DP managers need to develop an awareness of data dictionary concepts and understand their role within their own organizations.

But developing that awareness is not easy. Vendors will bombard you with glowing reports of the unique, outstanding features their system offers, but it is difficult to find a concise description of the real purpose of a data dictionary system or an easy-to-use method of comparing competitive products.

What you really need are answers to the following questions:

- What is a data dictionary?
- How does it work?
- Why should I use a data dictionary?
- When should I consider a data dictionary?
- How do I evaluate competitive data dictionary products?

I will answer these questions and, in addition, provide a list of data dictionary requirements that you can use to evaluate competitive products or to develop a more detailed understanding of data dictionary functionality.

What is a data dictionary?

Webster defines a dictionary as "a reference book listing alphabetically terms or names important to a particular subject or activity along with a discussion of their meanings and applications."

He calls it a *reference* book, a *listing* important to a particular subject that contains a *discussion* of meanings and applications. These are key words in the understanding of data dictionary concepts.

The particular subject important to a data dictionary, of course, is data. The scope can be narrowed further to include only automated data managed by information systems. Not all corporate data needs to be considered in the initial phases of a data dictionary implementation. The concept of a corporate data czar who is aware of and manages every piece of data anywhere in the corporation on any medium simply is not practical for most corporations.

The definition of a data dictionary, then, is "a reference file containing terms or names used in information systems applications along with a discussion of their meanings, sources and uses."

However, a data dictionary is more than a reference document. It is a tool that simplifies the documentation, control and management of information systems data. It encourages the concept that data is a resource and provides a mechanism to help you manage that resource. A data dictionary contains only a *description* of the data, not the data itself. The data itself is managed by data management systems.

A data dictionary usually contains the following information about data:

1. *A description of all data items.*
   - An English-language description of the data. For example, employee number may be defined as "a unique nine-digit identifier assigned to each employee."
   - A "data processing" description. Employee number may be described as "PIC X(9)."
2. *The source of all data.*
   - End-user source. End-user source describes how data enters the DP system. Does it come from the forecasting, cost accounting or personnel department? Source usually implies ownership and responsibility for the timely and accurate entry of the data.
   - DP source. Some data may be derived from DP operations. The DP source indicates which system and program creates the data.
3. *The use of the data.*
   - A list of reports that utilize the data.
   - A list of on-line screens that contain the data.
   - A list of programs that access the data and the actions they perform on it.
   - Cross-references of all data relationships maintained in the data dictionary. Uses within another data group, record, schema, subschema and so forth should be described.

(Continued on In Depth/2)

DATA FILES

CUSTOMER FILE

CUST. NAME	CUST. ADDRESS	CUST. NO.
1. SMITH	NEW YORK	1235
2. JONES	PHOENIX	0001

OPEN ORDER FILE

PART NO.	ORDER NO.	CUST. NAME
1. ABC	777	SMITH
2. XYZ	888	JONES

PRODUCT FILE

	PART NO.	ACT. COST	INV-ON-HAND	
	1. ABC	10.00	100	
	2. XYZ	11.00	200	

DATA DICTIONARY

DATA NAME	ENGLISH NAME	DESCRIPTION	PROGRAM FORMAT	SOURCE	USE
ACT. COST	ACTUAL COST	USES CURRENT LABOR RATES AND LATEST MATERIAL COST	9999V99	ACTUAL COST SYSTEM. PROGRAM AC1002	REPORT A REPORT B PROGRAM X PROGRAM Y PRODUCT FILE
CUST. ADDR	CUSTOMER ADDRESS	LATEST SHIP TO ADDRESS	X(32)	CUSTOMER SERVICE DEPT. VIA TRANSACTION 709	REPORT B REPORT E PROGRAM Q CUST. FILE
CUST. FILE	CUSTOMER FILE	CONTAINS ALL CUSTOMERS WHO HAVE PURCHASED A PRODUCT WITHIN LAST TWO YEARS	N/A	N/A	PROGRAM Q PROGRAM R

Figure 1

(Continued from In Depth/1)

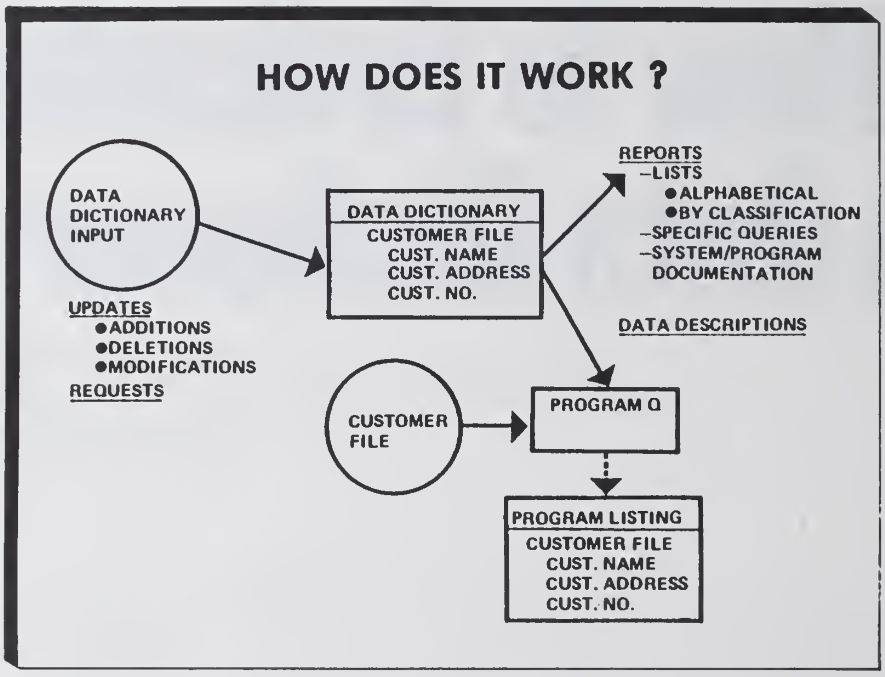

Figure 2

The relationship of a data dictionary to data contained on three data files is shown in Figure 1.

The titles "Customer name," "Customer address," "Customer number" and so on do not appear on the data files. Only the string of characters "smithnewyork1235" is on the data file, but the interpretation of this character string is provided externally through data file descriptions, for example, program FDs. All descriptions should be consistent and up-to-date.

This need for consistency is one reason a data dictionary is implemented. The dictionary provides a single source for data descriptions. All references and descriptions are drawn from this source. In this way, "part-no" for example, will be described consistently by all programs that access the open order and product files.

Some other data typically maintained by a data dictionary system is:

- *Allowable values* that data may assume. A particular item may be restricted to a range of numeric values or a set of alphabetic codes such as the 50 state abbreviations.
- *Edit routines* may be described; for example, "customer-number" may need to be verified before an order is accepted.
- *Calculations* required to determine an item's value may be described.
- *Classification* of an item. Is it a dollar amount, quantity, time, date or what?
- *Aliases* should be documented. "Employee-number" may also be called "employee-ID" or may be identical to "Social-Security-number."
- *Owner* of the data is especially important in a data base environment where data is shared but one user is responsible for its validity.
- *Key words* associated with a data item are another means of categorizing and searching for classes of data.

You may even use a data dictionary to describe programs, systems, JCL or other data maintained within your DP department. A more detailed description of data dictionary capabilities is contained in the evaluation section of this article.

How does it work?

Figure 2 shows the basic functions of a data dictionary. The data dictionary in the example contains a description of a customer file. Customer name, address and customer number are described. Updates and requests for information are submitted to the dictionary system via batch or on-line methods. The description of the customer file is used by program "Q" when it processes the customer file. All other programs processing the customer file also obtain the file description from the dictionary.

Other information produced by this data dictionary includes:

- A list of data elements contained in the dictionary. The list can be sequenced alphabetically, by classification, by key words and so one.
- Answers to specific queries. Typical queries might be "List all elements with a keyword of 'product' and 'quarterly' and a classification of 'dollar amount.'

"What programs update 'in-stock-inventory' on the 'component-inventory' file?"

The lists and query replies are used to determine if needed data already exists, how data fields are calculated and where data is used. Data dictionary output also serves as the official description of data for end user and DP documentation. System and program documentation can even be generated from the dictionary if system, program, module and JCL information is maintained by the dictionary.

Why use a data dictionary?

Use of a data dictionary should be encouraged for the following reasons.

Consistency of data descriptions.

- Documentation. All documentation, end user and DP, comes from the same source. When the description is changed, it is reflected in all documentation. If you have ever compared two or more sets of old documentation for consistency, you know the value of this feature.
- Programs. Consistent, meaningful data descriptions can be incorporated into every program. If you have ever tried to trace the path of a data element through a system where every program describes it in different terms and formats, you can appreciate this consistency.

The dictionary is a superb mechanism for implementing and enforcing data standards. But the data dictionary will not do this automatically. Its use must be mandated by department policy if the data standards are to be effective.

Efficiency.

- Descriptions are created once. Proper use of a data dictionary means that data descriptions are agreed upon and created only once. Programmers do not create new data descriptions every time a piece of data is used in a new system, program or documentation manual. This saves a lot of work.
- Data is reused. Dictionary outputs help to find out if data already exists — and where. This avoids the development and maintenance of redundant systems to enter, edit, update and output data that is already automated.

The data dictionary provides centralized, available, consistent and up-to-date documentation.

System development aid. The data dictionary is extremely useful for capturing, classifying, relating and displaying data for systems under development.

Automated cross-reference of data and programs. The cross-reference of data and programs contained in the dictionary can be used to:

- Estimate the effect of proposed data changes. How many programs or files will be affected by this change? How much compile time will be needed? How many files must be recreated?
- Locate the source of "bad" data. What programs update this data?
- Identify the effect of "bad" data. What programs or reports use this data?

Answers to the following questions

(Continued on In Depth/4)

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(*Continued from In Depth/2*)

will indicate if a data dictionary is appropriate for your organization.

- How many man-months have been spent in needless programming to produce data which is already available?
- How much disk space is wasted by redundant data?
- Can you measure the cost of a change before making the change so that a real cost-benefit comparison can be made?
- How many man-weeks can be cut from the development cycle by the automatic creation of record and segment layouts, data base management system (DBMS) control statements, Cobol, assembly and PL/I data division entries?
- Could the maintenance efforts be simplified through the use of standard data names and symbols?
- How much longer does it take to fix a bug if documentation is not current, is unavailable or is scattered in several different locations?
- Would life be a little easier if the user could understand what the system does with his data?
- Would the automatic preparation of documentation reduce the typing burden? How simple is it to keep your present documentation system current and complete?
- How much time might be saved by knowing who creates and who uses what data, when and how?
- Do you know the interrelationships of your data?

When should I consider a data dictionary?

- Any time if you have a lot of data or to minimize the cost of application modification.
- Before you convert to a DBMS — because you have to analyze the elements that will be going into the data base in order to eliminate unwanted redundancy, learn data interrelationships and explore alternative data structures. The data dictionary can be a very powerful tool to simplify this process.
- Before a large development project to reduce application systems development and implementation lead time and cost.
- As part of a standards program to allow for establishment and enforcement of standards relating to data usage and responsibility.

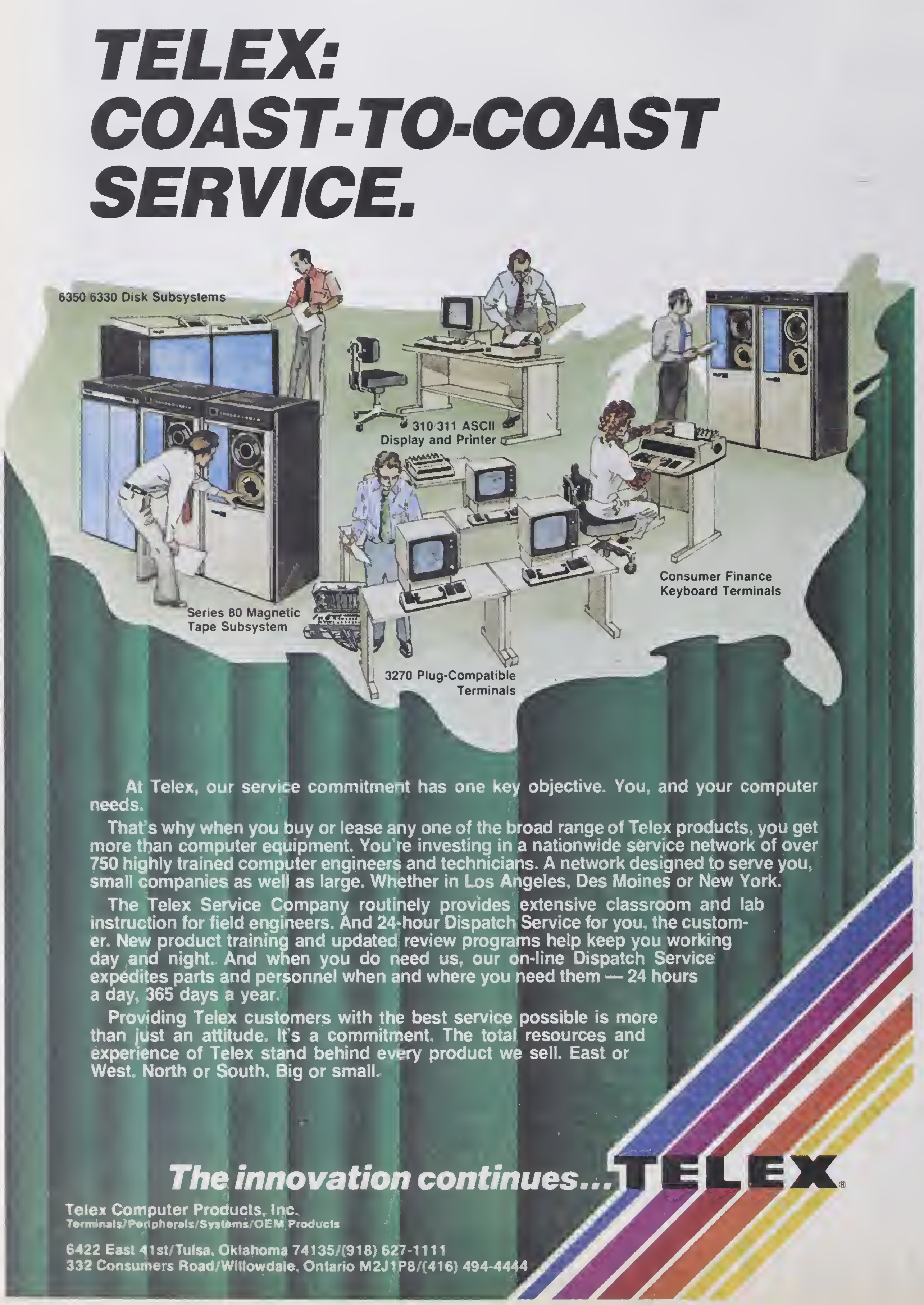
How do I evaluate competitive data dictionary products?

Any evaluation process should use objective measurement criteria. A data dictionary evaluation should use a list of your required functionality weighted according to the relative importance of each function to your shop. Competitive products can then be rated against this list. Such a list, or "scorecard," is shown in Figure 3. An explanation of each function is given below.

In addition to providing criteria for the evaluation of data dictionary products, the list also serves as:

- A functional specification for a data dictionary system. If I were developing a data dictionary system, what functionality should it have?
- A detailed definition of a data dictionary system.
- A vehicle for understanding what a data dictionary system can do for you.

Any competitive data dictionary product should meet the following criteria: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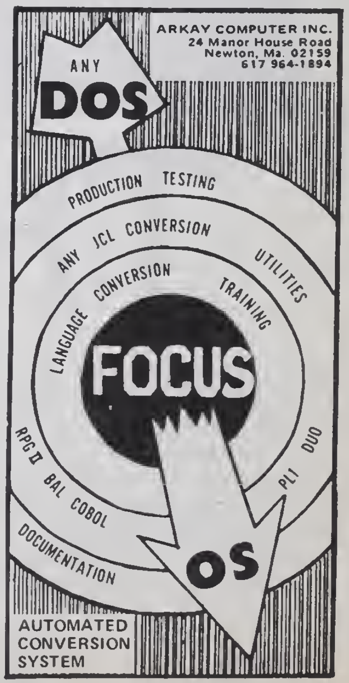
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Hardware

The dictionary system must be evaluated in relation to your current and planned hardware configurations.

• *Current hardware configuration.* Make sure that the package is currently running on your hardware configuration. Vendors will assure you that this is so, but what they may really mean is that it *will* run on your configuration after some adaptations. The vendor may be seeking some "seed money" to make the conversion or may want you to be a test site.

Call or visit sites who are running the package on your configuration. Learn about their experience. It can help you avoid costly mistakes.

• *Future hardware configuration.* If you are planning a change in hardware, make sure the dictionary is currently running on your proposed configuration. For example, if you are planning a distributed minicomputer-based environment, check the compatibility of that environment with the dictionary. You may want to access the dictionary through your minicomputer network.

Software

The dictionary system is essentially a collection of software. The quality of that software is extremely important.

• *Operating system.* The entire package must run under your vendor's *current* standard operating system. Packages that require modifications to the operating system can lock you into the current version, compromise your vendor support, complicate later vendor enhancements to the operating system and delay conversion to a more state-of-the-art operating system.

• *Software independence.* Ideally, the software should be as "independent" and portable as possible. However, complete hardware and operating system independence is neither possible nor always desirable.

Utilization of unique hardware or software characteristics may make the dictionary more attractive. For example, it may enable the dictionary to be more efficient, to use less memory or to be more easily accessed. The importance of software independence to your shop should be reflected in the weight assigned to this function on the scorecard.

Software independence has two facets.

1. Source language independence. The package should be written in a standard, portable language such as Cobol-74. Assembly language code is much less portable and requires special talents to modify and debug. Packages do "bomb" occasionally, and it's handy if in-house personnel can find the problem. If you plan to modify the package, in-house knowledge of the source language is mandatory. Take a look at the source code. You may be amazed to discover that it is a rat's nest of called subroutines that defy understanding. Some packages were originally written in assembly language and later "converted" to Cobol line by line by various coders, with various techniques. Avoid these if possible.

On the other hand, you may be pleasantly surprised to learn that the code is structured, modular and well documented. This will simplify your understanding of the package, and will help the vendor modify the code in an efficient, "bug-free" manner.

2. DBMS independence. Some data dictionary products are dependent upon a particular DBMS. This means that the DBMS is used as the file access mechanism for the dictionary system itself. For example, IBM's IMS may be used to maintain dictionary information and cross-references.

There are pros and cons to the dependence of a data dictionary system upon a particular DBMS.

a. Pro DBMS dependence. The use of a DBMS permits efficient random processing. This allows on-line update and inquiry and also makes the batch updating of a relatively few items more efficient. DBMS usage means that "ad hoc" queries and special reports can be processed quickly and that data redundancy can be avoided. The usage may also mean that a closer integration between the dictionary and DBMS can be achieved. Dictionary data descriptions can be used directly by the DBMS rather than having the dictionary generate DBMS data descriptions.

b. Against DBMS dependence. The first argument against DBMS dependence is that it makes the dictionary less portable. It may not be possible to use the dictionary on a variety of hardware and operating system configurations. A dictionary utilizing IMS and CICS may be incompatible with your Digital Equipment Corp. minicomputer network. Conventional file structures such as sequential, Isam, are apt to be more portable.

The second argument against DBMS dependence is that you may be required to purchase and support the DBMS software. You may already have another DBMS and feel the added expense and required in-house expertise, coupled with the cost of the dictionary, is too costly. The same is true for transaction processing monitors.

• *Source code availability.* It is always beneficial to have the dictionary source code available. First, it helps to locate problems when aborts occur. The problem may be the result of faulty dictionary code, your own faulty DBMS, teleprocessing or dictionary implementation, operating system bugs, hardware malfunctions and so on. It is difficult to locate the source of the problem if you don't know what specific actions the dictionary was attempting at the time of the abort.

Second, source code is necessary if you wish to alter the code. This is always a risky operation and should be avoided if possible, but if you are willing to accept the risk, source code is obviously required.

• *Standard file structures.* Standard file structures are those that are fully supported by your operating system or DBMS. Nonstandard structures are those unique to the dictionary software. Standard file structures are preferable because they can be accessed via your normal programming methods and languages and are less apt to be obsoleted by operating system changes.

• *Modular.* The software should be modular; only the code for those functions being performed should be in memory. It may sound nice to hear that the system contains only two programs until you realize that each one nearly exhausts your available memory. In addition, such monoliths are usually more prone to failure and more difficult to enhance.

Data Dictionary Checklist

Product Name	Weight	X	Vendor Score	=	Weighted Score
HARDWARE					
• Compatibility with current hardware configuration					
• Compatibility with future hardware configuration					
SOFTWARE					
• Operating system compatibility					
• Software independence					
- Source language independence					
- DBMS independence					
• Source code availability					
• Standard file structures					
• Modularity					
VENDOR SUPPORT					
• Support availability					
• Maintenance performance					
• Enhancements					
• Documentation					
• Training					
SYSTEM CAPABILITIES					
• System input capabilities					
• Input flexibility					
• Integration with file handlers					
• Interface with current programs					
• System output capabilities					
- Standard reports					
- Cross-reference reports					
- Kwic and Kwoc reports					
• Query and report facilities					
INFORMATION MAINTAINED					
• Sufficient data types					
• System-maintained information					
• User-maintained information					
SYSTEM OPERATION					
• On-line					
• Batch					
• Cross-reference maintenance					
• JCL					
SECURITY					
• System files					
• System functions					
				TOTAL	

Weight
How important is this function to you? A scale of 1 to 10 is appropriate with 10 as the highest score.

Vendor Score
How well does this data dictionary package perform this function? The following scoring mechanism can be used to rate performance.

0 = Function not available
1 = Available, not demonstrated
2 = Clumsy implementation
5 = Adequate implementation
8 = Superior implementation

Weighted Score
Multiply (1) and (2). The total of all the weighted scores for a vendor is the total vendor score. The highest total vendor score indicates the best system for your shop.

Figure 3

Vendor Support

The dictionary software may be useless if it is not properly supported. Investigate the extent and quality of the vendor support. Talk to other users.

(Continued on In Depth/6)

(Continued from In Depth/5)

The following aspects of vendor support should be checked:

- *Support availability.* Local support is desirable but not necessary if the software is well documented and has been in use long enough to clean out the bugs. "Hot-line" telephone support should be available. Most problems with stable applications software can be resolved in this manner. The service should be a standard part of the maintenance agreement and be available during your working hours.
- *Maintenance.* "Bug fixing" should be performed quickly and professionally. Fixes should not introduce new problems. Problems fixed in one release must not reappear in the next release.

A standard method of applying and logging fixes should be available. Few things are more irritating than to pay maintenance fees for software that can't be used because of a bug in a critical subroutine. Check carefully with other users on the vendor's maintenance performance.

- *Enhancements.* No one expects purchased software to be a "dead-end" product. It should be continually enhanced to fit changing environments. A data dictionary should evolve so that it is compatible with a variety of on-line, data base and query environments. It should evolve from a passive, stand-alone product to one that is active at sysgen, compile and execute time, supplying data and collecting and recording statistics in a real-time environment.

All this will not be available in initial versions. But if the vendor is not actively enhancing the product, it will soon become obsolete and you will be stuck with a system that hinders rather than encourages your progress.

Enhancements should be supplied in a form that is easy to install. Card decks or lists of octal patches are not acceptable. Distribution of a complete new version of the source code that can be installed and compiled is a good method. Installation and compilation can then be accomplished quickly with few chances for on-site foul-ups.

- *Documentation.* Documentation should include an overview of system functions. The overview should orient the reader and indicate where more specific detailed information can be found.

The documentation should also include a description of the system's technical operation including data flow from program to program and a description of file structures and formats. These will be required if you plan to alter the normal data flow or change vendor-supplied programs, files or transactions.

A summary of each program must be supplied that describes its purpose, input, output and a summary of its operation. All program error messages must be fully described to permit efficient error recovery.

All input forms must be fully described, and instructions for completing the forms should be provided. It is helpful if the documentation indicates which program will process each transaction. All system output must be described. The purpose of each report should be given along with an explanation of all report headings.

A clear explanation of the options available for each report should be given. For example, a report may be available in an abbreviated form or for a subset of the full dictionary.

- *Training.* Proper training will ensure effective and efficient use of the dictionary software. Initial training and installation assistance should be a part of the purchase price. Additional training and consultation should be available if needed at a stated cost. It is more convenient and less expensive if training is available at your own site, particularly if you want to train a number of programmers and users in the capabilities of the system.

System Capabilities

You purchase a dictionary system for the capabilities it provides. Examine its capabilities carefully.

- *System input capabilities.* The dictionary system should have an entry definition language that presents a consistent, easy-to-use interface. The interface should be user-oriented and not require a programming background. It should be usable by clerical personnel. Capabilities should be provided to describe the following data types: files, schema records, sequential and Isam records, JCL, sets, areas,

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transactions, data groups, items, reports and source documents. "Effective," "proposed" and "superseded" versions of all data types must be system maintainable.

You must be able to enter a definition without structure to aid the system development process. For example, entry of data items during systems development should be possible without requiring the item to be associated with a specific data record. This association can be created later in the data base or file design process.

- *Input flexibility.* Identical entry capabilities should be available in both batch and on-line environments. The advantages of on-line entry and edit of data have been proven in many business applications. The same advantages apply to the maintenance of the data dictionary.
- *Integration with file handlers.* Only one entry should be required to describe data for the dictionary and for operating system file handlers. The data description must be shared by the dictionary and file handlers, or the dictionary should generate file and record descriptions. Only one description should be maintained regardless of how many places an entry is used or how many entries are subordinate to it. In other words, the "many-to-many" relationship capabilities must exist.
- *Interface with current programs.* You must be able to build dictionary entries automatically from existing Cobol file descriptions. This capability should apply to sequential, Isam and data base file structures. This facility will allow data descriptions existing in current systems to be included in the dictionary without rekeyboarding.

An added useful feature is a utility to change data descriptions in current programs to standard data descriptions. This allows the full capabilities of the data dictionary to be applied to programs written many years ago as well as to new programs that, hopefully, use more standardized data description approaches.

- *System output capabilities.* The dictionary should contain a series of standard reports and a capability to generate "ad hoc" reports.

Standard reports. Standard vendor-supplied reports should include the following:

1) A full list of all dictionary entries in alphabetical sequence with complete or abbreviated descriptions. This report is primarily a reference tool and may be produced in its entirety very infrequently.

2) A list of those entries that have been updated since a certain date. The data is usually the date the last full dictionary listing was produced. The combination of this report and the full dictionary listing provides a current description of all data entries.

3) A list of entries meeting user-specified criteria, such as a given record, group or data item. This is particularly helpful during systems development when data items, records and data bases may be frequently changed.

Cross-reference reports showing:

1) Where an entry is used. A report on a data item for example, would show which groups, records, files, programs, subschemas, schemas and transactions contain that data item. Optionally, it should show *how* the data is used — whether a program reads, writes, modifies or deletes an item or whether it opens a file for inquiry or update. These reports help to determine the effect of a proposed change, e.g. what programs and files need to be changed, and possible sources of "bad" data, e.g. what programs update this item.

2) What an entry uses. A report on a schema, for instance, would show the areas, sets, records, items and subschemas within that schema.

Kwoc and Kwic reports. Key word out of context (Kwoc) and key word in context (Kwic) reports for all or selected files or file types should be available. These reports help to determine if proposed data items already exist within the data dictionary.

You should have the option to generate as much or as little detail in these standard reports as you wish. All cross-reference reports should be available for the entire dictionary or for only user-selected entries.

An optional capability should be available to produce any of the standard reports on an on-line terminal. This is particularly helpful when quick decisions need to be made. It also avoids printing extensive reports

(Continued on In Depth/10)

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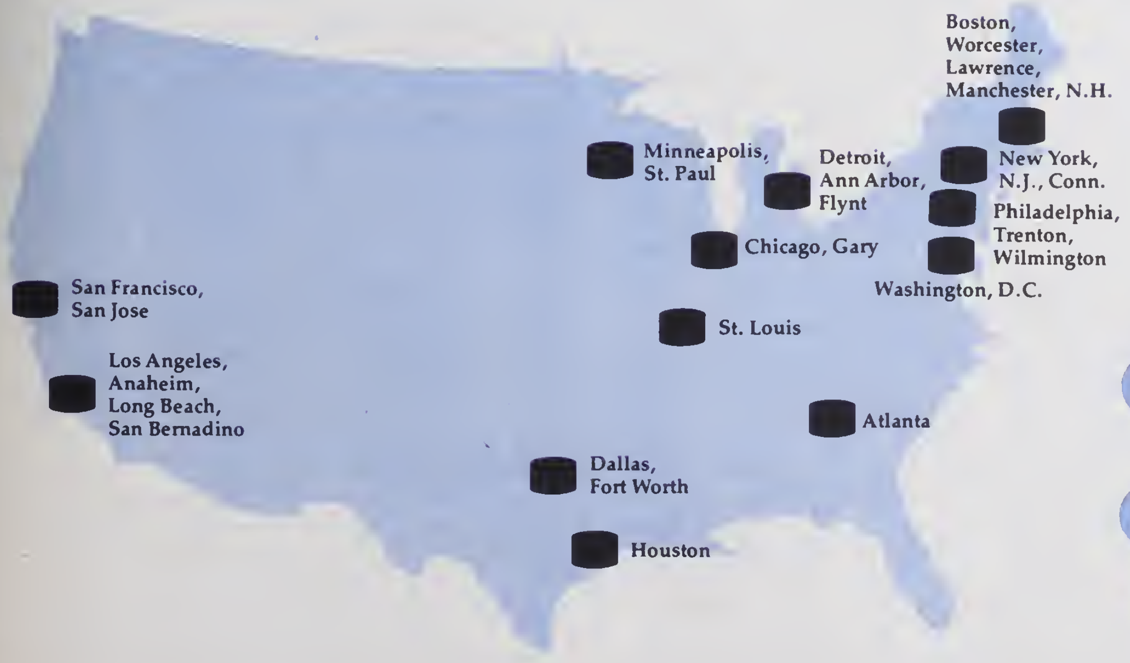
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(Continued from In Depth/7)

when just a small amount of data is needed.

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- *Query and report facilities.* A query and reporting language should be available to scan the data dictionary and:

1. Interrogate any field in the dictionary, including key words, for the presence and absence of a particular value or relationship.
2. Interrogate any relationship maintained by the system. For example, where used or call out paths should be accessible via the query and report facilities.
3. Format the output of the query according to the user-defined criteria. This allows you to design and produce your own reports without extensive Cobol coding.

Information Maintained

In order to be effective, certain basic information must be maintained.

- *Data types.* In addition to the data types mentioned above, nonstandard data types should be allowed within the dictionary. For example, you may want to describe a process that would include such elements as division, department, production line and product.
- *System-maintained information.* The following information about data elements should be maintained as a standard system function.

English language name. This is the "external" name that is used in ordinary conversation.

English language description. The system should be able to maintain as much descriptive data about an element as the user cares to input.

Cobol name. This is the name that appears on the Cobol listing. The name should be descriptive and meaningful so that the full documentary value of Cobol is achieved.

Cobol description. This is the picture clause used by the Cobol compiler. This value will remain constant for all descriptions of the data element generated by the data dictionary.

Schema name. This is needed by Codasyl data base management systems. The schema name is the name by which the data element is known to the schema translator. This may be different from the Cobol or subschema name.

Schema description. This is the type clause that appears in the schema source language. It describes the physical characteristics of the data as it resides on magnetic media. It may differ from "logical" Cobol or subschema descriptions.

Reference number. The dictionary system should maintain a unique system-assigned reference number. It can be used as a "shorthand" means of referring to an item when using manual forms or accessing an item on-line.

Last update. The date and time of the last update to each data element should be system-maintained. This is important in order to verify the currency of the information.

Alias. It is sometimes desirable to maintain a synonym or alias. This may be required when data descriptions are derived from existing programs that use inconsistent data names. Aliases should be kept to a minimum whenever possible so that programmers can readily identify a data element whenever it is encountered.

Record prefix or suffix. You may want to use a unique record prefix or suffix for every data element within a given record. This allows a programmer to know the source or destination of a data element appearing in the procedure division. A prefix or suffix may be necessary to uniquely qualify a data element that appears in one or more records within the same program.

Key words. Up to 15 key words should be able to be associated with a data element. Key words are very helpful in locating specific types of information within a data dictionary. For instance, you may want to obtain a list of all data elements with the key words "product," "quarterly" and "inventory."

Notes. You may wish to have notes appear on the Cobol data division listing. The notes may describe allowable values of a coded item or information useful to maintenance programmers.

Data type. This is the category of item being described — file, record, group, element and so on. The dictionary system should allow you to establish your own data categories. This greatly extends the flexibility of the data dictionary system, allowing you to describe such things as organization, products or other data types unique to your business.

Classification. Classification refers to such things as dollar amount, coded value, description, date, number, rate, time, quantity, weight and so on. In addition to further describing an element, classification is useful when combined with key words to determine if and where specific information is being maintained.

Owner. This is the user who has primary responsibility for maintaining this data element. It is first necessary to establish this responsibility so that the element is maintained consistently and accurately.

File description data. All data needed to generate sequential, Isam, Vsam, Dbms and other records must be system-maintained so that the dictionary can be the sole source of all data descriptions.

- *User-maintained information.* The following information should be *able* to be maintained within the system by the user.

Formula. It is often helpful to

(Continued on In Depth/12)

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(*Continued from In Depth/10*)

maintain a description of the formula used for the derivation of data elements. This is especially helpful for data elements appearing on output reports.

Allowable values. The allowable values will form the basis for edits within the system. An optional data dictionary feature may transform these allowable values into edit routines that are inserted automatically into Cobol programs or are called upon at runtime.

Security. The security level associated with an item indicates what types of protection should be given to a data element, who can access the item and may even contain passwords needed to access, update or extract the data element.

Number of occurrences. The number of occurrences of an item or record is very useful when new files are being designed or for monitoring the size of certain files. An active data dictionary system automatically maintains this number based upon runtime statistics.

Report distribution. You should be able to maintain report distributions on the data dictionary.

System Operation

The manner in which the system performs its functions may determine its suitability for your environment.

- *On-line operation.* The on-line portion of the dictionary system should utilize standard transaction processors such as CICS or Environ One, so that your technical staff will be familiar with its operation and can integrate it into existing on-line executives. The size of the executive for the data dictionary system should be reasonable.
- *Batch operation.* Determine the size and runtime for commonly used dictionary batch programs. This can usually be done by talking with existing users of the dictionary system.
- *Cross-reference maintenance.* Program-to-data cross-reference relationships should be maintained automatically by the dictionary software. If this information is maintained manually, it will not be current and accurate and will require a substantial amount of personnel time to maintain.
- *JCL.* The JCL for all standard functions should be provided by the vendor as part of the purchase price. You should not have to create any JCL unless you wish to deviate from the standard data flow.

Security

To a large extent, security is determined by your site's physical and operating system security. The dictionary system should enhance that security.

- *System files.* All files maintained by the data dictionary must be protected by a series of passwords and IDs. Sensitive information must not be accessible by all users.
- *System functions.* System functions should be protected by a series of passwords. At a minimum, there should be a division between update and inquiry permissions. Not all users should be able to update all data maintained on the dictionary system. Some information is sensitive, and some users are simply not qualified to update the data dictionary.

Jack E. Ewers is manager of systems and programming for Honeywell, Inc.'s Building Services Division in Minneapolis.

Ewers has held various data processing positions with Honeywell and Gelco Corp. In his present position, he also provides consulting services to Honeywell's internal divisions on data base/data dictionary, DP productivity, security and office automation.

Ewers holds an M.B.A. degree from the University of Detroit.

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Designing a Successful User-Computer Dialogue

BY A.F. GRILZ

"I have never been able to understand why it is that just because I am unintelligible, nobody understands me."

— Milton Mayer

If computers could speak for themselves, Milton Mayer might not be credited as the originator of this statement. The advent of on-line systems has created an area of systems design that concerns itself with the development of dialogue between the computer and the user; but unfortunately the dialogue in many cases becomes a problem instead of a solution.

For the computer to become a truly productive tool, it must function on the user's terms. Unfortunately, on-line systems are designed from a narrow perspective — DP's.

To design successful user-computer dialogue, we must understand three things: what it is, why it is so important and what method will ensure a successful design.

What exactly is user-computer dialogue? *Webster's New World Dictionary* defines dialogue as "an exchange of ideas." In the context of our discussion, we can interchange the word "ideas" with "information" and obtain a definition for our purposes of user-computer dialogue as "the exchange of information between the computer and user."

The dialogue itself can be categorized as either question-and-answer or informational.

Question-and-answer dialogues are typically characterized by a message that requests data followed by an appropriate response satisfying the request. Types of question-and-answer dialogues are yes/no, in which the appropriate response is simply a yes or no (or Y or N); true/false, which is a variant of yes/no; and multiple choice, in which the user is provided with a number of options of which only one can be selected (menus are an example of this). And finally, "fill in the blank," in which the user is not limited in the number of appropriate response possibilities.

Informational dialogues differ from question-and-answer in that no response from the user is necessarily expected. Examples are program status messages such as "JOB IN PROGRESS" or "JOB COMPLETE"; usage instructions, such as how to operate the terminal or printer; and error messages, which fall into two categories: warning messages, in which no immediate action needs to be taken, and critical messages, in which the error condition requires attention. In the case of critical messages, it is a good idea to highlight the display in some way to attract the user's attention. Report data also falls into the category of information dialogue.

All dialogue is constructed with one or more messages. The message may be a single word, a sentence or a group of sentences.

Messages can be handled in one of two ways: They can be coded directly into the program or stored in a message file and referenced as required.

The major advantage of using the message file is that you do not have to recompile the program or programs using the message if you decide to change the content of a message. Some hardware makes the message file concept available as part of the system software, and it is well worth using.

If you do not have this capability, you can design your own message file by using an indexed or direct-access file and assigning a message number to each line of message text. Each record is one line of text and the record length is limited by the number of characters that will fit in one line of the display. To display the message, you would simply reference the file by appropriate number and move the message text to a display field.

No Fury Like a User Scorned

In order for the computer to become a truly productive tool in business, it must function on the user's terms; that is, it must appear to the user to be functioning within the scope of the user's specific requirements. (Whether or not the user is technically oriented is irrelevant.) Unfortunately, on-line systems are often designed from a narrow perspective: data processing's.

Obviously, the computer itself cannot determine the proper dialogue. The system designers and programmers' job is to assure that the dialogue is relevant to the user.

If you have ever traveled to a foreign country, you can appreciate the frustration of not being able to express yourself adequately to someone who does not speak your language; and conversely, not being able to understand someone else.

The same situation occurs between the computer and user. For the programmer who speaks "computerese," the messages may seem clear. But to the user with little or no technical knowledge of the system, it may as well be speaking a language used by only 10 people in Outer Mongolia. When this happens, a stalemate occurs. The computer cannot function as the user wishes and is not able to maximize productivity.

The danger in this is obvious. Users are frustrated when their expectations are not met.

Even if the systems design and programming use the latest structured techniques, if the user cannot understand the messages the computer is trying to relay and cannot thereby respond appropriately to the message, the user will quickly become frustrated and refuse to accept the computer as a tool. If this occurs, the system is doomed.

On the other hand, the systems design and programming can be the poorest excuse for code since pig latin, but if the user can get the computer to function as required with a minimum of aggravation, the system will probably be around for quite some time.

The method in which you use dialogue has a good deal to do with whether or not the dialogue is success-

(Continued on In Depth/14)

(Continued from In Depth/13)

ful. The designers can minimize user frustration by applying a bit of psychology.

"Psychological closure" is a fancy term for the concept that the human mind must obtain input constantly in order to remain alert. If it does not, the brain will shift its attention to a different topic. Daydreaming is one familiar result.

If what you are currently observing is of no interest to you, your mind seems to "close off" that item and wander on to one more suitable.

Studies have shown that if the brain is not updated with new information every three to four seconds, closure will occur. This is important to dialogue design because you will want to ensure that closure does not occur too often.

For example, when the computer is processing and the user presses ENTER, the screen may not change for three or more seconds. As a result, the user's mind will tend to wander from the job at hand. This is why long system response times are of such concern.

If you know that the processing will take more than three seconds, you should provide a message informing the user that processing is in progress and about how long it will take before function resumes. For example:

```
PLEASE WAIT 5 MINUTES
WHILE INFORMATION IS PROCESSED
```

This tells the user it is all right to divert attention to another task for the length of time specified. Of course, in the case of long response times there is not much you can do.

Another psychological factor that comes into play when designing dialogue is based upon a study performed by Nobel Prize recipient Herbert Simon. His study determined that the brain is composed of short- and long-term memory (which is nearly infinite in capacity.) For a "chunk" of data to be retained by long-term memory, a person must be exposed to the data for five to 10 seconds. When designing dialogue, you want to make sure that information to be retained for a length of time (15 minutes or more) is displayed long enough for the user to have a chance to "store" the data in his long-term memory.

Short-term memory, on the other hand, can store only five plus or minus two "chunks" of data at any one time, and the retention period for that data is relatively short. Providing the user with too many chunks of data in one display will be of no use to him since only three to seven chunks can be retained at one time. The moral is, keep messages concise.

A third and most critical factor in designing dialogue is the use of proper English syntax. If the user cannot understand the messages within the dialogue, it is useless.

Another major element in the development of successful user-computer dialogue is the anticipation of user needs and expectations. You must first determine the characteristics of the type of user.

In most businesses, users can be categorized as:

1. Upper management.
2. Middle management or supervisory.
3. Clerical.
4. Specialists.

Upper management personnel generally use the computer infrequently. Their primary interest is in summary information in both report and graphic form. Because of infrequent use, usage instruction is required along with question-and-answer dialogue that is explicit in its requests.

Middle management or supervisory users utilize the computer more often than upper management and are interested in both summary and detail data. Their primary use will be inquiry applications, but they may get involved in limited data entry.

Clerical personnel are frequent users of the computer, usually accessing the same job on a daily basis. They become quite familiar with computer functions and are primarily interested in processing large volumes of data. Their function includes both data entry and inquiry applications.

Specialized users such as scientists, engineers, DP personnel, doctors and lawyers require specialized terminology. The frequency with which they use the system will vary greatly between individuals, with the highest

frequency occurring for DPers because of the nature of the specialty.

Four Considerations

The following four considerations will help you design a practical user-computer dialogue.

1. Consider the user's job function. It can tell you a good deal about how to design the dialogue for a particular application.

A user at the upper management level, as mentioned earlier, will rely upon the computer to provide summarized information and precise dialogue. A chief financial officer, for example, will be interested in financial data presented within accepted accounting conventions. Messages should be constructed with respect to financial and accounting terminology. It would be all right in this case to reference a profit-and-loss statement as a "P&L," but for a display used by a manufacturing manager to whom the term "P&L" may reference an item unique to manufacturing, it is better not to use the abbreviated form.

At the clerical level, an accounts payable clerk, for example, may not necessarily be familiar with terminology related to accounts receivable. The same phrase may mean different things in different areas of expertise. Because of this, knowing the job function to which a program relates is important in determining proper dialogue construction.

The term "account balance" by itself may have one meaning to accounts payable, another to accounts receivable and another to general ledger. Use of the term "account balance" in a message viewed by a controller who is responsible for all three areas would probably cause some confusion.

Use specific terminology as it relates to the job function.

2. Consider the frequency with which the user will use the system. For the infrequent user, you will have to pay more attention to the instructional information on how to run the system in general — how to sign on and sign off, who to contact in case of difficulty with operating the system and how to utilize the various features of the terminal or printer. For the frequent user, a more appropriate approach would be to make this information available upon request as opposed to automatically.

At the progam level, user-computer dialogue tends to be a question-and-answer nature rather than instructional. The question-and-answer dialogue for infrequently used programs must be explicit in order to ensure that the user understands the criteria for making the appropriate response. The message "DO YOU WISH TO CONTINUE?" would be inappropriate, since no indication of acceptable response criteria is given. It would be better to display, "DO YOU WISH TO CONTINUE? (ENTER YES OR NO)."

Informational dialogue for infrequently used programs must also be precise as in the case of an error message that *explains* the conditions of the error rather than *indicates* the nature of the error.

For example, in the case of an error message issued for an unsuccessful attempt by the computer to find a requested customer number, a program that is frequently used by a particular user may simply display:

```
CUSTOMER NUMBER NOT FOUND
```

But for the case of a program with the same error condition whose primary user infrequently runs the program, the error message should display as:

```
THE CUSTOMER NUMBER YOU HAVE ENTERED DOES NOT EXIST ON THE CUSTOMER FILE.

PLEASE REENTER THE DESIRED NUMBER CORRECTLY, OR CONSULT THE CUSTOMER MASTER LIST FOR THE CORRECT NUMBER.
```

3. Consider the user's level of understanding. There are two forms of understanding as it applies to user-computer dialogue: understanding of DP and the users' understanding of how the computer relates to their job function.

For the user with little understanding of DP, care must be taken not to include any systems jargon in the dialogue (for that matter, it wouldn't hurt to avoid that jargon whether the user is knowledgeable about DP or not). A message that pertains to a customer

(Continued on In Depth/16)

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(Continued from In Depth/15)

master file named CUSTMAST, for example, should not refer to the file as CUSTMAST, but rather as the CUSTOMER FILE.

The user's level of understanding about his job function as it relates to the computer dictates the degree to which the dialogue must be instructional. A low level of understanding requires that more attention be paid to detail. If the program is to be used by an individual with relatively little understanding (an example may be a part-time accounting clerk who works after normal business hours), you would not want to have the first display the user sees be a data entry display without any precise explanation as to the function of that particular job and what to expect in terms of running that job.

More than likely, some of that information will be provided in user documentation, but it is comforting to the user to be provided with a condensed version of this information before he actually starts the job. You may even include a reference to the user documentation and on what page instructions for running the job can be found.

4. Consider the user's personality. This one is a bit tougher than the others since you may not always know who the user will be, let alone something about his personality. If it is possible for you to gather some information about the primary user of the program, it can be of great help in determining how to construct the dialogue. This also assumes that the program will be primarily for one user such as a department manager or company president.

When you are able to consider the user's personality, things to look for include the pace at which the user normally works, whether he becomes easily frustrated with the computer, whether he pays attention to detail and whether he will take the time to read the dialogue.

If the user normally works at a fast pace, you will want to condense and present instructions before you actually get into performing the function. Once into the job, do not slow up processing by presenting a "play-by-play" description of everything the user has done.

If the user tends to get easily frustrated with the system, the stress can be relieved by writing the dialogue on a personal level such as by referring to the user on a first-name basis. However, be careful not to use a condescending tone in the dialogue.

If the user tends not to pay attention to detail, design the display so that critical messages catch his attention. This can be done by highlighting, blinking, underlining or formatting the message differently.

In the case of the user who simply does not take the time to read the dialogue, you will want to use the dialogue in such a way that he cannot proceed to the next step without understanding the messages.

Obviously users may show any combination of these traits. One of the challenges of designing good user-computer dialogue is to correctly analyze the situation.

In conclusion, the important points to remember when designing user-computer dialogue are:

- The key to successful system implementation is user acceptance, and good user-computer dialogue is critical to this acceptance.
- The purpose of user-computer dialogue is to exchange information between the user and the computer in a way that is meaningful to the user.
- The user's needs must be anticipated.
- The most important user characteristics to be considered are job function, frequency of system use, level of understanding and personality.

A.F. Grilz is a systems analyst with Kroy Industries, Inc. in St. Paul, Minn.

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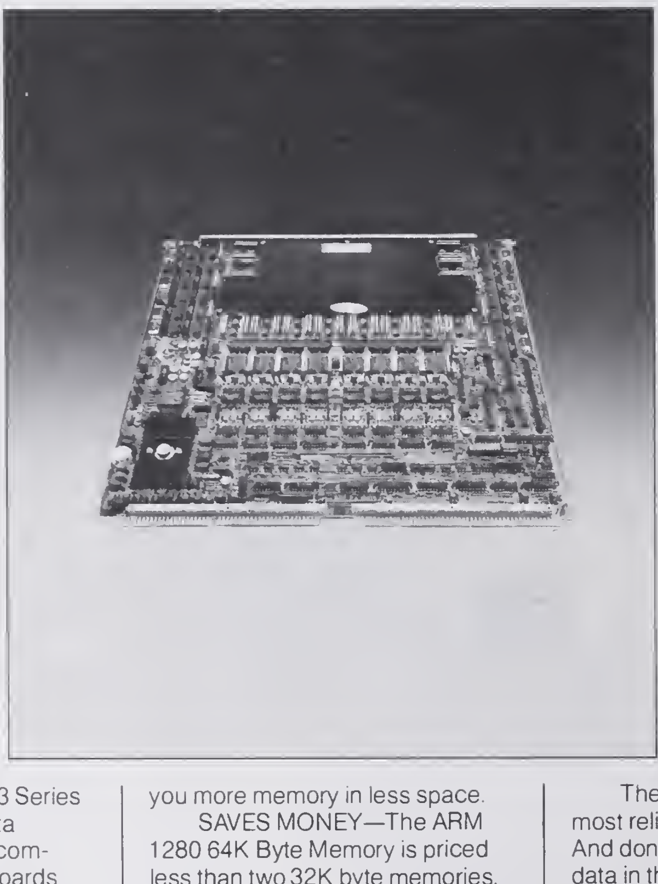

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Future Systems — Part 1

Batch-to-Transaction Road Holds Potholes

By Frederic G. Withington
Special to CW

CAMBRIDGE, Mass. — While many users of applications have made the transition from batch to transaction processing, many have not been so successful.

In order to migrate to a system that provides fast response processing from a data base via a communications network to the point of transaction, a user must expect certain capabilities from that system.

For instance, 'most users want to operate in multiple modes: batch, remote batch, time-sharing, word processing and transaction processing in an intermixed manner — without having to preschedule the degree of use of each mode. Users must also be able to emulate their past processing environments — both the instruction sets and system software complexes — with which their information systems were built.

Computer systems have come a long way, but have even farther to go to meet users' fast-paced processing needs. In this first part of a four-part series, Frederic G. Withington of Arthur D. Little, Inc. looks behind the future systems curtain and sees some functional requirements and hardware and software design principles that are a starting point for these systems' leap from the drawing board.

Also, users not only want to intermix different processing modes, but to vary execution priorities in terms of time deadlines. For example, in terms of the importance of the user or importance of the function supported. In addition, the system must be able to allocate system resources according to demand, establishing priorities with little or no assistance from operators.

Other system capabilities necessary to make the transition from batch to transaction processing include:

- Automatic memory and file management, or a system that moves programs and data automatically among the hierarchy of storage devices. These functions are controlled in a user-transparent manner with most housekeeping chores performed automatically.
- High availability and security. Almost certain availability for at least high-priority functions, and it must be difficult to the point of impracticality for sensitive file information to be accessed by unauthorized persons.
- Ease of use. Many early central data base and transaction problems derived from the complexity of the hardware and system software. Large staffs of specialists were needed to comprehend and apply it. However, thousands of organizations that would like to perform transaction processing cannot afford such staffs.

With Maturity

The latest computer systems are beginning to meet these functional requirements quite well, and it is becoming clear how fully mature versions will work. They will be directed entirely in high-level languages and be entirely self-scheduling and self-organizing in the sense of memory, file and communications management. All stimuli presented to the system, such as run requests, inquiries and program compilations will be received by a conversational scheduler. The scheduler diagnoses any problems, such as JCL errors, and schedules the required operations.

Conversations with users and the transaction processing systems will be conducted primarily in an improved command language, simpler and closer to natural language than the present offerings. New programs, report

(Continued on Page 60)

Intel Adds General-Purpose Memory

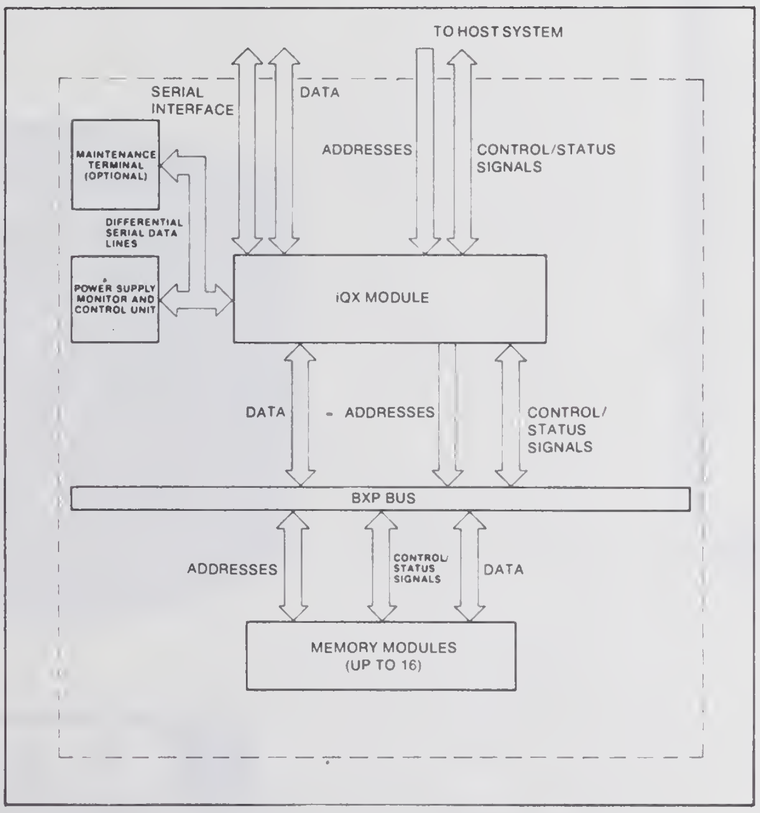
SUNNYVALE, Calif. — Intel Corp. has announced a general-purpose memory package with **built-in intelligence, memory fault tolerance, advanced diagnostics and preventive maintenance features.**

Called the iQX Intelligent Memory, the package is an enhancement to Intel's Series 90 family of general-purpose dynamic and static memory products, Intel said.

The system provides three methods of exercising the diagnostic capabilities — through the host processor, through a Service Communicator or remotely.

A typical system with a 550 nsec cycle time and 1M-byte by 64-bit configuration costs $142,770, or $17,850 per 1M byte.

The remote diagnostic system costs $16,590 and a software-only package costs $5,600, the vendor said from 1302 N. Mathilda Ave., Sunnyvale, Calif. 94086.



Series 90/iQX Memory System, Block Diagram

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Batch-to-Transaction Road Seen Long, Winding

(Continued from Page 59)

specifications and the like will be stated by the users in improved versions of present programming languages. File management, memory allocation, resource allocation and all other internal system management functions will be conducted by automatic, universal methods.

The user will have no knowledge of the location of data or the detailed status of the system, except through monitor programs.

Such a high level of automatic system operation is obviously difficult to achieve. However, a set of hardware and software design principles that have been steadily increasing should, if well and comprehensively implemented, enable computer systems to approach this objective.

These design principles are as follows:

- Automatic communications management, by which varied line, terminal and message characteristics are automatically handled by a front-end controller and system management software. This function is already well performed in the latest large computer systems. The next challenge, which is already partly met, will be no interface devices and protocols from different vendors.
- Automatic file management. The housekeeping functions of file management are capable of being handled by automatic, generic solutions comprised of methods located in the system's file subsystem controller. File subsystems of this type are just now appearing.
- Fail-soft features. These can be achieved by providing at least two of every essential system element and by periodic insertion into the job stream of routines that test each system module's operation. When a module fails, it is isolated, the operator informed of the failure and the system reschedules the job stream to put aside low-priority operations. The system never pauses. This feature has appeared in a few systems and will probably be present in all future network processors.
- Distribution of processing functions into subsystems. This is necessary to support the redundancy inherent in Failsoft, and the greater separation of functions in the use of automatic communications and file management. The low cost of general-purpose microprocessors and larger component computers facilitates their use as a cost-effective alternative to monolithic processors.
- Variable stored logic. Already widely used to accommodate emulators for past machines and to tailor some computers to optimally execute particular programming languages. Stored logic has also proved its effectiveness in accelerating certain operating systems functions. This principle is likely to be extended to the point where computers and controllers of various kinds will be able to interchange functions so the systems can be reconfigured dynamically.
- Virtual machines. Entire computer systems including peripherals and operating systems can be emulated by virtual machine monitors. These exist today, but are too inefficient for general use. However, using high-speed stored logic they can probably become operational tools. They also maximize the isolation between modes of use, thereby contributing to privacy and data security.
- Self-measurement. The system will tell the user when it is dynamically reconfiguring itself and reassigning priorities. It will also tell where bottlenecks occur and report on sources of errors or problems. To some extent all modern operating systems already do this, but much improvement is possible.
- Easier programming. Such concepts as top-down design, structured programming and semiautomatic documentation are capable of support by machine aids. In short, conversational debugging leads by degrees into batch testing linked program modules against test data bases. The rising cost of systems development would make many users happy to pay for additional hardware and software capacity to support such facilities in order to ease the process and decrease total system development costs.

Unfortunately, most of the above hardware and software design principles decrease the efficiency of the computer system. Future systems are therefore likely to be less efficient than those of today, because more of the machines' resources will be used in performing housekeeping functions.

Frederic Withington is vice-president of the Information Systems Group at Arthur D. Little, Inc., Acorn Park, Cambridge, Mass. 02140.

Trilog Offers Two Printers

IRVINE, Calif. — Trilog, Inc. has announced two raster matrix impact printers.

Called the Trilog-150 and the Trilog-300, the units print at 150- and 300 line/min respectively. The Trilog-150 can be field-upgraded to the larger Trilog-300, the vendor said.

Deliveries are scheduled for September 1981. The Trilog-150 costs $2,600 and the Trilog-300 costs $3,900, the vendor said from 17391 Murphy Ave., Irvine, Calif. 92714.

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Industry-Related Computer Problems

Mini Gives College Students the Business

Special to CW

HAMDEN, Conn. — More than 50 years ago, Quinnipiac College and its School of Business swung open its ivy-covered doors during the worst of economic times — the Great Depression. Then, the school's main objective was to teach survival in the faltering business world.

Now, wit times debatably better, the college's curriculum still stresses business savvy, but uses a minicomputer to prepare students for their entry into business after graduation.

Although located in the small rural hamlet of Hamden, Quinnipiac is far from being a backwater educational operation. In fact, the school was one of the first in the nation to offer two-year associate and four-year bachelor's degrees in information systems.

Currently, 146 students are majoring in the unusual degree program that prepares them to solve computer-related problems specific to a given industry or company, according to Frank R. Papale, director of management information systems at the school. An additional 374 business majors take at least two data processing courses as part of their degree requirements.

Administration's Share

True to the school's commitment to business, Quinnipiac shares the Hewlett-Packard Co. HP 3000 computer between the School of Business and the college's administrative department.

The computer "is saving the school time and money, and is sending our students into the world with a firm grasp on the realities of the business community," Papale explained.

The HP 3000 has helped Quinnipiac College increase its alumni donations from $20,000 to $80,000 a year. The callers for this alumni phone bank are themselves former students of the college. The computer has increased turnaround time on the information collected during the phone drive, and enables callers to know which alumni need a reminder to send a check or make a donation.

The minicomputer system consists of the processor with about 750K bytes of memory. Approximately one-third of the memory is dedicated to the students, with the remaining two-thirds saved for administrative needs. The students have nine 2621A terminals and an HP 2613A line printer available to them, while the administration uses seven HP 2645 terminals and one HP 2617A line printer. Three HP 7925 disk drives with 120M bytes of memory each and one HP 7970E tape drive complete the hardware.

The software used by the college primarily provides the students with a variety of experience in programming. In addition to HP's Image/Query data base system, students can also work with industry-standard languages such as RPG, Cobol, Fortran and Basic. HP's RPG, Cobol, and View/3000 are used by the administration.

Before acquiring the on-line minicomputer, the school relied on a batch system that dragged processing time allotted to each department.

In determining the cost-effectiveness of the new equipment, Papale compared the old rental cost of $48,000 per year to the total cost of the HP 3000, which the college has obtained on a lease-purchase option. Within five years, the computer will have paid for itself based on those criteria alone, according to Papale.

"For example, in one department alone, we have been able to reduce costs by almost $12,500 a year," Papale noted. "That is a direct cost that we no longer have to pay, and is only one example from the one department. I think you can appreciate how quickly the savings accumulate."

Also, while Quinnipiac still used the batch

(Continued on Page 63)

IBM-Compatible Tape System Ties Into TI's 990 Tiline

SAN DIEGO — Innovative Data Technology, Inc. has introduced an IBM/Ansi-compatible magnetic tape system that can be plugged directly into the Texas Instruments, Inc. 990 Tiline.

The Model TI-1050 consists of a single-card tape controller that connects to the IDT Series 1050 formatted tape transport. It uses a dual-density, 9-track, 45 in./sec tape transport for either 800 char./in. (NRZI) or 1,600 char./in. (P.E.), and provides over 40M bytes of data storage on a 2,400-ft reel of tape 10.5 in. in diameter.

The controller manages data transfer between the drive and the CPU via the Tiline.

The Model TI-1050 replaces the TI 979A tape system. Its features include up to four drives from one controller and a drive-embedded formatter that provides dual density (NRZI/PE).

The cost of the TI-1050 with NRZI only is $9,070. With P.E. only, it costs $9,456, and with dual density, the cost of the TI-1050 is $9,850.

The vendor is located at 4060 Morena Blvd., San Diego, Calif. 92117.

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Mini Gives the Business To College Computer Classes

(Continued from Page 61)

computing system, students were often hard pressed to obtain computer time, and preparation of input was extremely time-consuming because all data had to be keypunched before it could go to the computer. Further, because of administrative needs, the computer was available to students only between 4 p.m. and midnight.

"It was first come, first served," Papale said. "Because it took approximately two minutes to run an assignment, if you were, say, No. 10 in line, you had to wait at least 20 minutes for your turn at the computer. We had a lot of tired students, who had already put in a full day of classes, hanging out at the computer center at 11 and 12 o'clock at night."

The additional terminals mean that more students can work at once, while the additional computing capabilities have opened up the lab another eight hours per day to students — from 8 a.m. until midnight. Because the HP 3000 requires no supervision, it is also possible for students to program on weekends as well.

"In fact, the biggest problem we now have is easy accessibility," Papale said. "Because the HP 3000 is so easy to use, students tend to resort to trial and error rather than thinking a problem through. We gently remind them that thinking is still the preferred method."

Finally, Papale was also concerned with security. "We had to be sure that the students could not access the administrative data base, or that some unsuspecting clerk could not tap into the students' data base." HP's MPE operating system reportedly solved that problem.

In addition, use of the computer has helped Quinnipiac increase alumni donations from approximately $20,000 a year to almost $80,000 over the past several years. This represents a 43% rate of participation, which is about two and one half times the national average, according to Domenic J. Twohill, vice-president for external affairs. "I think we can attribute part of the increase to our personnel and the computer." The HP 3000 keeps track of 8,000 alumni.

The computer prints out combination prospect information/pledge cards, which are sorted according to local calls, calls within the state of Connecticut, and out-of-state calls. The cards are further subdivided by year of graduation. Each volunteer is then given a stack of alumni names to contact and names are entered into the computer.

The alumni fundraising drive was previously done manually but it was difficult to contact all alumni before the end of the year. "Now, there is no problem," Twohill said. "We have current data at our fingertips. It takes only hours instead of days to remind our late pledges or to update our files."

In its administrative capacity, the HP 3000 helps process students from the initial application for admission through graduation and alumni status. In one department alone, the computer has saved Quinnipiac College approximately $12,500 in just one year of operation.

Micro Handles Dental Offices

PHOENIX — A microcomputer designed specifically for dentists to handle management functions of the office has been announced by Computer Information Systems, Inc.

The System 6000 requires only basic typing skills to operate and comes with standard software that includes accounts receivable, patient recall, insurance forms, accounts payable, payroll, patient billing and word processing, the vendor said.

As part of a Full Service Pak option, the company will train office staff in the system's use and will offer any programming updates and modifications as they are developed, the company said.

Prices for the basic model of the System 6000 start at $14,850 or $395 per month from Computer Information Systems, Inc., 20 E. Main St., Mesa, Ariz. 85201.

When you need a printout fast and there's no time for mistakes or failure, you can depend on the Dataproducts M-200. It's twice as fast as most other serial matrix printers. With reliability second to none.

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GREAT MOMEN

Data Spooler Added to MIP-3/A

NEWTON, Mass. — Computer Design and Applications, Inc. has enhanced its MIP-3/A input processor with a Data Spooler which spools data continuously onto a Digital Equipment Corp. PDP-11 system disk at a rate of up to 100,000 samples per second.

An on-board, bit-sliced microcomputer automatically switches between buffers in the dual-ported memory, facilitating uninterrupted data acquisition and spooling, the vendor said.

Data enters the MIP-3/A spooler on up to 16 analog data lines connected to the included BNC panel. The analog-to-digital converter samples up to 16 channels of multiplexed data at a rate of 100KHz and resolves the data to 12-bit accuracy.

A 20K-word by 16-bit dual-ported memory buffers the data until the data spooler's control processor interrupts the DEC PDP-11 to indicate a full buffer. The PDP-11 system disk reads the full buffer as the spooler accumulates data in the other.

The standard hex-size (8.4- by 15.7-in.) board and one quad (8.4- by 10.5-in.) board plug directly into the small peripheral controller slots of the Unibus and are powered by the DEC PDP-11. The software portion of the product includes a driver for either the RT-11 or the RSX-11M operating systems.

The MIP-3/A Data Spooler is available for $7,320, including support software on magnetic tape, documentation and a one-year warranty. The vendor is located at 377 Elliott St., Newton, Mass. 02164.

Winchester Disk Drive Boasts SMD Compatibility

SUNNYVALE, Calif. — A 600M-byte disk drive, said to specify the same transfer rate and interface format approach as the storage module drives (SMD) used with Digital Equipment Corp.'s PDP-11/70, VAX-11/780 and Unibus computer, has been announced by Systems Industries, Inc.

The SMD-compatible Winchester disk drive lists 6,000 hours mean time between failure among reliability specifications and features a sealed head-disk assembly which can be exchanged in 15 minutes, the vendor said.

The disk drive has an average access time of 25 msec and maximum seek time of 50 msec and comes with a moving head assembly and a total of 675M bytes of unformatted storage, the vendor claimed.

The 600M-byte Winchester, complete with a Series 9400 controller, is priced at $37,000 for a typical PDP-11 configuration from Systems Industries, P.O. Box 9025, 525 Oakmead Pkwy., Sunnyvale, Calif. 94086.

Vista Computer Introduces Impact Printers

SANTA ANA, Calif. — A series of impact printers, which produce letter-quality printing using standard Diablo or Qume-type 96-char. print wheels, has been developed by Vista Computer Co.

The V300 Series Daisy Wheel Printers includes a 26 char./sec and a 45 char./sec model. Both can accommodate paper widths up to 15 in. and can print up to 136 columns. Character spacing is 1/120 in. minimum and line space is 1/48 in. minimum.

The V300 is available with either an industry standard Centronics parallel interface or RS-232C. Internal DIP switches can be used to select system operating parameters, such as 7- or 8-bit char. lengths, single- or double-stop bits, odd or even parity and 300, 600, 1,200 or 2,400 bit/sec ratio.

A programmable vertical format unit allows users to select a maximum form length up to 66 lines with top-of-form and VT justification.

The V300-25 costs $1,895 and the V300-45 costs $2,195. The vendor is located at 1317 E. Edinger Ave., Santa Ana, Calif. 92705.

Add-In Board Fits DEC Users

WESTLAKE VILLAGE, Calif. — Chrislin Industries, Inc. has announced a 256K-byte single dual-width add-in memory board for Digital Equipment Corp. PDP-11/23 and PDP-11/23 systems.

Features include a 4M-byte address field, parity checks, a 240 nsec access time, 400 nsec cycle time and a single 5-volt power requirement, the vendor said.

The memory board costs $2,550 for the 256K-byte by 9 option. A 128K-byte by 9 option costs $1,925, the vendor said from 31312 Via Colinas No. 102, Westlake Village, Calif. 91361.

Disk System Runs With DEC VT-103

SAN JOSE, Calif. — Data Systems Design, Inc. has announced the DSD 880 Winchester/floppy disk storage system.

The system can reportedly be used to configure a desktop computer system in partnership with Digital Equipment Corp.'s VT-103 intelligent terminal.

The unit costs $7,495 and is compatible with all DEC LSI-11-based hardware and software, the firm said from 2241 Lundy Ave., San Jose, Calif. 95131.

So easy to own, it practically takes care of itself.

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Semi Industry Feeling Squeeze From Japan

Special to CW

SAN FRANCISCO — Much of the U.S. semiconductor industry is being squeezed between a rock and a hard place, according to panelists at the very large-scale integration (VLSI) forecasting session at the IEEE Computer Society's spring computer conference.

The impending Japanese foray into the U.S. semiconductor industry is now a current fact of life and Japanese are rapidly displacing U.S. merchant semiconductor suppliers, according to H. Jones, president of Gnostic Concepts.

In addition, as if the semi industry did not have enough trouble watching its market for mass devices be grabbed up by the Japanese, there is a "dramatic" increase in the captive sectors' production of custom circuits, he added.

The captive sector consists of hardware vendors that have in-house fabrication facilities, such as IBM, Bell Laboratories and increasingly, Hewlett-Packard Co., Digital Equipment Corp. and Control Data Corp., he said.

There are ways out of the squeeze, Jones commented. He suggested turning to vertical integration and putting operating systems and specific functions on chips. Another way out of the dilemma

(Continued on Page 68)

Megatek Not Regretting Graphics Move

By Rita Shoor
CW Staff

SAN DIEGO — Government contract research and development work was the springboard for Megatek Corp. here. But just two years after the company was formed in 1972, top management decided to pursue the burgeoning commercial computer graphics market.

There is absolutely no reason to regret that change in direction, according to John Moreland, director of product planning and development.

Sales last year were $11.4 million and earnings in the $1 million range for this privately held firm, he said. The entire computer graphics market is currently doubling between 25% and 50% annually, he maintained. Megatek typically increases at market share and "we intend to keep it that way."

Since 1975, the firm has only done "a few hundred thousand [dollars] in government contracts" and a corporate decision was made in 1980 to get completely out of government research and development work, he said. "We're a computer graphics firm and that's where we have to concentrate our efforts," Moreland stated.

While Megatek's future may not lie in acquisition by Data General Corp, [CW, Feb. 2], its first commercial product was a board for the DG Nova, he said. Marking the company's entry into the industrial market in late 1973, the BP721 refresh graphics interface provided refresh memory and point and vector intensity control for the mini, he explained.

Next came the Megraphic 6000 system, which was marketed for about a year, according to Moreland. This model was then replaced by a 5000 system — essentially a stand-alone graphics workstation that was a "much enhanced version" of the 6000.

Megatek began to appeal to a wider market with the introduction of its Whizzard 7000 system in 1977. While identical vector generation technology was used for both the 5000 and 7000 systems, the latter was designed to be host-independent rather than being tied to just one mini family, Moreland explained.

CW Photo by R. Shoor

John Moreland

The product line was expanded again last year with the introduction of the Whizzard 7200 and 6200 series, he said. The 7200 includes upgraded models that offer vector refresh graphics, color raster graphics or a 7290 that combines both types of display in a single system.

Inclusion of real-time raster display capabilities was necessary because "in the computer-assisted design market, production is the name of the game," Moreland noted. "If you have to wait 20 seconds to repaint the picture, it's too long." The same technology minus some of the enhancements and options is available in the 6200 family, he continued.

Primarily viewed as a graphics system firm, Megatek has most recently moved into the device-independent software market with its Template graphics package. "We saw ourselves as a hardware company," Moreland said, but "we've always marketed Megatek Graphics Software to support our

(Continued on Page 66)

DP Suppliers Remain Confused Over Changing Export Controls

By Bohdan O. Szuprowicz
Special to CW

Analysis

The sharpening political rhetoric of U.S.-Soviet relations, a more business-oriented administration in Washington and the recent Export Administration Act and Multilateral Trade Agreement passed by Congress in 1979 all combine to create a new environment for the control of exports of computers, software and peripherals from the U.S.

Many DP suppliers remain confused by the rapidly changing conditions of foreign trade in computer hardware and a high degree of politicization of some of it. This is particularly true when sales are made to China or Soviet Bloc countries — but the U.S. Export Administration Act requires licensing controls on many high-technology products to most countries of the world, whatever their political and ideological coloration.

In fact, the major objectives of U.S. export controls are to exercise vigilance over commodities and products that affect national security; to further significantly U.S. foreign policy and aid in fulfilling international responsibilities; and to protect the domestic economy from excessive drain of scarce materials, thereby also

(Continued on Page 66)

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Changing Export Rules Confusing Suppliers

(Continued from Page 65)

preventing inflationary pressures.

The national security aspects of export controls far outweigh the other considerations, but trouble begins when it is necessary to establish what effect the export of a computer is likely to have on a potential adversary. This is not a simple matter that can be settled by an end-user statement from a Hungarian research institute, for example.

The Technical Advisory Committees of the export controls program face the problem of determining whether the sale will have a "resource-freeing" or "capability-enhancing" effect on the military sector of the country in question. Either of those effects could be considered sufficient grounds for denial of an export license. It is really a matter of degree.

There are Technical Advisory Committees consisting of members from industry and government agencies which specialize in several product areas involving advanced high technology, particularly when it is considered extractable from the end products. These committees concern themselves with such product areas as computer systems, peripherals, components and related test equipment, numerically controlled machine tools, electronic instruments, semiconductors and related equipment and telecommunications hardware.

Exports of other products such as aircraft, jet engines, nuclear equipment and all types of weapons are also strictly controlled by the U.S. government.

The policies under which export controls are administered by the U.S. Department of Commerce are developed by the Advisory Committee for export Policy (Acep). This body includes representation from the Departments of Commerce, Defense, Energy, State, Transportation and Treasury, the National Security Council, the Arms Control and Disarmament Agency, the National Aeronautics and Space Administration, the Central Intelligence Agency, the Office of Science and Technology Policy and other members as appropriate.

The Technical Advisory Committees assist those organizations or their officials on questions involving technical matters. They keep track of worldwide availability of comparable computer hardware and software, their actual utilization and production technology levels in foreign countries.

There is a virtual embargo on exports of computers and most products to Cuba, Cambodia, North Korea and Vietnam. Official policy permits exports of computer hardware and software to the Soviet Union and Eastern Europe on condition that their use will not prove detrimental to the national security of the U.S.

Until recently China was also in that group, but now computers and other military equipment for use in strengthening China's defenses may be licensed for export to that country on a case-by-case basis. Controls on exports to all other Free World countries except Canada are maintained primarily to assure against reexport or transshipment to destinations that would not be approved under this program.

For Other Purposes

Foreign policy controls may also come into play even if it is determined that a computer will not enhance the military capabilities of a potential adversary. Such was the case when, after the Afghanistan invasion, President Carter embargoed computer sales to the Soviet Union that were previously licensed for export.

Embargoes on sales to Cuba, South African police and military establishments and on trade with Rhodesia-Zimbabwe in previous years fall into that category. In such cases, export controls are used as a political "bargaining chip" or "signaling device" in the larger arena of East-West relations in particular.

Until the rules of trade between East and West change dramatically, export controls in one form or another will remain a fact of life. This is so because any trade in the Free World can take place any time unless restricted by the government. By contrast, no trade takes place in the Soviet Bloc unless the state permits it, and by simply not buying or not selling, these countries have a built-in political discriminatory mechanism that must be counteracted by the West.

Megatek Staying In Graphics

(Continued from Page 65)

hardware."

However, "as the cost of functionality comes down, hardware winds up costing people a lot less than software," he said.

Upper management, particularly in large corporations, will increasingly recognize this fact and it will lead to more multivendor environments, he predicted.

Because of this projected need, Megatek has been interested in device-independent software for a long time. However, software requires far more support than hardware and "we didn't want to get into it until we had the resources to do the job right," he continued.

Template was introduced at the Siggraph conference last year and is "just starting to really move."

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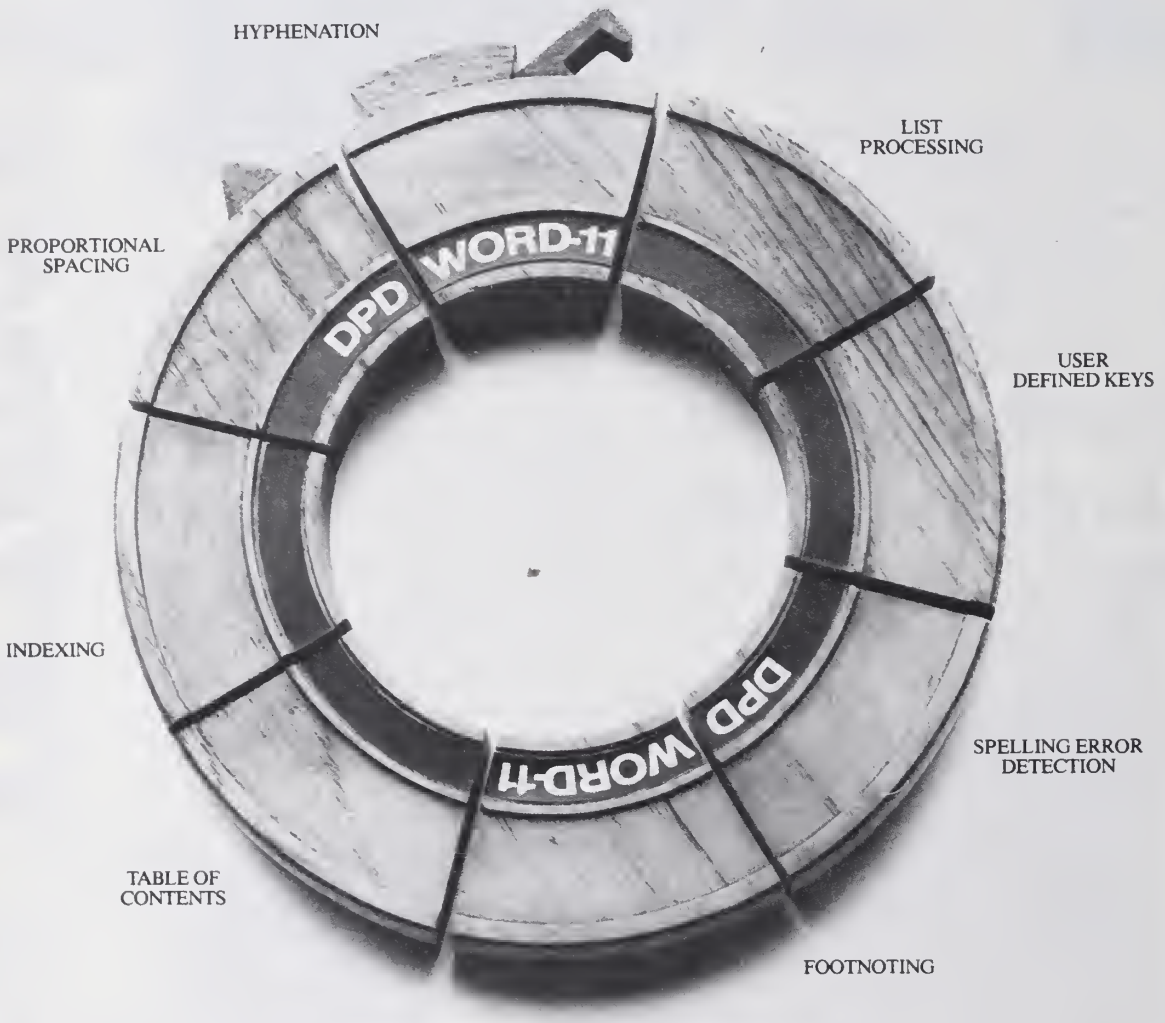

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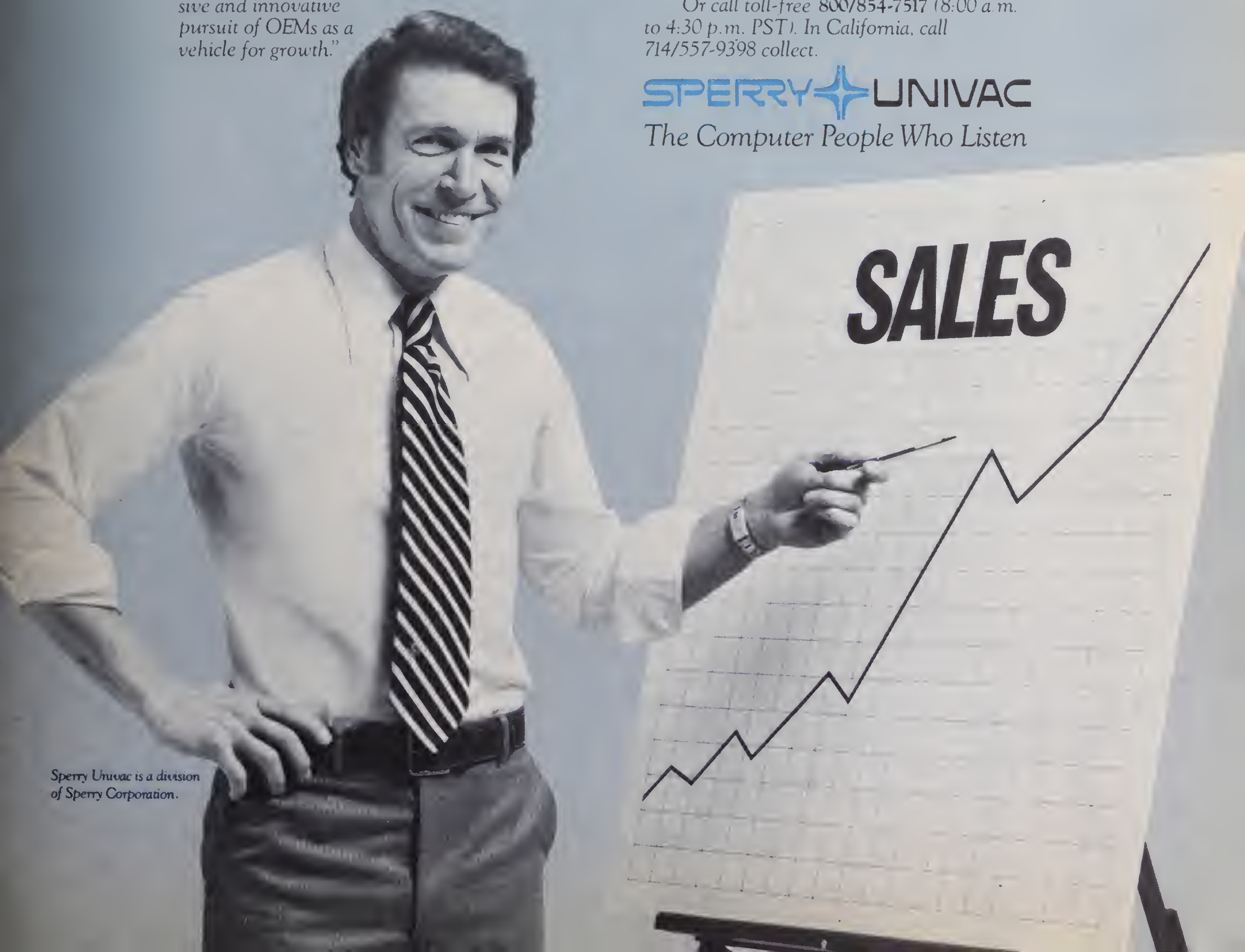

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Increased Productivity

Chances Sighted in Semi, DP Fallout

By Molly Upton
Special to CW

SAN FRANCISCO — The "fallout" of the coalescence of the computer and semiconductor industries will be huge opportunities for all, because the industry creates productivity — somewhat contrary to the usual laws of economics, according to Carver Mead, a professor at the California Institute of Technology.

In his keynote speech, "The Next Revolution in Electronics," at the IEEE Computer Society's Spring Computer Conference (Compcon) here recently, Mead stressed that the players are not engaged in a zero sum game where someone has to lose; "everyone can win," he said.

Efforts on the leading edge always benefit the rest of the industry, Mead commented. For instance, as the technology advances, there is more and more need for discrete devices, small-scale integrated components, medium-scale integrated components and "off-the-sheet" large-scale integration (LSI).

The next 10 to 20 years will see a maturation of the industry, he predicted.

An infrastructure is evolving to service the industry and encompasses such capital-intensive functions as fabrication, he said, citing the weekly headlines about new companies in this area. "Fabrication should be left to the professionals." Companies ought to design their own chips and take them to these service firms, he advised.

Industry Parallel

Mead likened the semiconductor to the internal combustion engine and noted that mature industries are named after the industries they serve. For instance, there is not an "internal combustion engine industry," but rather a farm equipment industry and an auto industry. The key lies in applications.

The two areas of design technology that offer the potential for revolutions are systems design methodology and highly concurrent systems architecture, he observed. "Because of VLSI (very large-scale integration) our whole way of thinking regarding systems has been revolutionized," he commented. Calling the time when one CPU was thought the limit, Mead noted that now multiple microprocessors are everywhere. "Even the local gas pump has a couple of computers in it."

VLSI has allowed users to have an arbitrary number of computers, but multiple systems are hard to manage. Now there is talk of thousands of systems, and the "discipline of managing large numbers of systems is very exciting and coming along," Mead said, observing this is an area for pioneers.

Mead dismissed other areas as no longer offering the same revolutionary potential. For instance, circuit logic design is "interesting;" fabric technology has a lot of "grunt work" left to do to attain the thin line levels delineated by physics; and device physics really had its heyday back in the '50s and early '60s, he said.

Big Challenges

The challenges for designers of multiple systems are not small. For instance, "today's languages are useless to describe multiple systems," Mead said, urging people to think about systems differently.

"We need some really good ideas; it's time to get back to Point A," the area where there are a few good people who understand what they're doing, he explained. The next points on Mead's industry evolution chart are B, where there are several entrepreneurs, and then C, where the industry is replete with professional managers.

In commenting on the current state of affairs, Mead said the industry is becoming more like the steel and auto industries and ceases to be fun. "When that happens, it's time to go off and find another Point A."

Upton is editor of "EDP Industry Report," an International Data Corp. publication.

Japan Squeezing Semi Industry

(Continued from Page 65)

would be to compete with the Japanese in Japan, Jones added.

The U.S. VLSI industry will grow from $30 billion in 1980 to $100 billion in 1990, Jones stated. There will be some changes in the rankings of device popularity.

CMOS to Dominate

MOS will cut into bipolar, and static random-access memory (RAM) systems will be less expensive than dynamic when they get to be 256K-byte, he observed. In addition, static speeds will become faster and more reliable. CMOS will be the "dominant technology" of the '80s, he said, although some in the audience visibly disagreed.

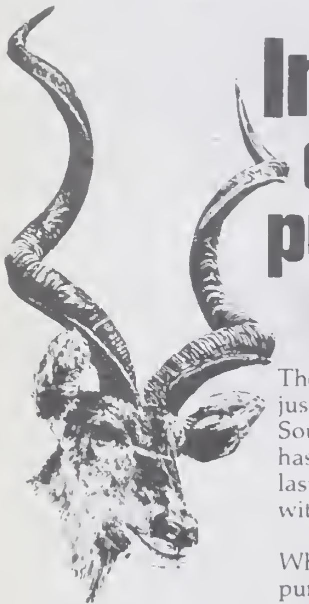
For very high-speed devices, gallium arsenide will squeeze out emitter coupled logic (ECL) at the 1,000 gate device level, he indicated.

Jones gave his opinions previous to the session in which Richard Konian of IBM described the Konian-Walsh circuit, which he said is faster than ECL, but with power requirements down in the range of transister logic.

Jones observed the Japanese companies entered the U.S. mass semi market half-way down the learning curve with the 16K-byte dynamic RAM and are now the leaders in 64K-byte systems.

In terms of poising themselves on the learning curve, "the Japanese are now where Intel Corp. has been," and Jones predicted the Japanese will garner 60% of the U.S. merchant market in 64K-byte systems and an even higher share of 256K-byte systems.

In static CMOS, the leaders are again Toshiba, NEC Information Systems, Inc., Hitachi, Ltd. and Fujitsu, Ltd, he said.



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Time Broker's Greatest Enemy: Fear of Change

By Tim Scannell
CW Staff

NEW YORK — Stan Goldman's greatest enemy is fear. Not his, but that of data processing and noncomputer professionals who are afraid to trust sometimes inefficient computer operations to an outside party.

"People in this industry are very frightened of changing something that's working," Goldman observed. "Even if it's not state of the art and even if you could cut operation costs in half."

Goldman is president and chief cheerleader of Time Brokers, Inc., a 17-year-old company here in the business of convincing managers, executives and everybody else that you can have more control over a computer system for less cost by letting another person carry the mainframe burden.

Mixing marketing dexterity and amateur psychology with good old-fashioned common sense, Goldman helps executives and small business people find other corporations that have computer time to spare. He then matches buyers with sellers and arranges batch, time-sharing and even telecommunications type of relationships.

So far, his zealous sales pitch has not only convinced a number of large users to hand portions of their operational reins to someone else, but has guided scores of ex-turnkey users burned by easy-to-use but useless electronic marvels to safe computer harbors.

Despite rational arguments, Goldman's most difficult job is prying a manager's fingers from even the most antiquated and delapidated of computer systems.

"People don't understand that they often can control a project better outside than inside their own data center," he stated. "Mainly because the motivation is different. When people are on salary, there's no real reason to produce," he continued. "Even though your boss is down your neck, you can get away with murder." On the other hand, "When people spend money on results and not machinery, you've got to produce," Goldman countered.

While Goldman does not want to appear to be economically sadistic, he readily admits that a business such as his thrives when the economy is having financial coronaries.

During a recession, when budgets are tight, companies buy computer time as an economical alternative to an in-house computer, the Time

Hamilton/Avnet To Distribute Adds' Multivision

HAUPPAUGE, N.Y. — Applied Digital Data Systems, Inc. (Adds) announced it has reached agreement with Hamilton/Avnet for the distribution of Adds' Multivision family of small business computer systems.

Hamilton/Avnet is a large national industrial distributor with 42 offices in the U.S. and Canada.

Brian D. Wiltshire, vice-president and general manager of Adds' Systems Division, said, "This partnership marks a major milestone in Adds' marketing plan which is focused on the establishment of carefully selected channels that complement each other." Wiltshire noted that the company is also considering regional distributors and OEMs as outlets for marketing Multivision.

"Our product offering ideally suits Hamilton/Avnet's plan to market total business systems including peripherals, software and a CP/M-compatible microcomputer," Wiltshire said.

Terms of the agreement call for shipment of a combination of models within the product family starting in April. Hamilton/Avnet and Adds will provide full service, training and financing, Adds said.

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Among Computer Professionals, Businesses

Brokers chief explained. Occasionally, a number of customers may give up an expensive mainframe in favor of buying computer time and reinstall the exact same hardware when the economy loosens its financially-asphyxiating grip.

"A recession forces managers to make a decision about keeping their equipment. And that's why we tend to make money during a recession — which is lovely," Goldman said.

One thing that does tend to throw a wrench into Time Brokers' works is the steadily declining price of hardware. Like the dinosaurs, nearly all of Goldman's $1,500 to $2,000 per month clients have become extinct because of the proliferation of sophisticated and affordable mini- and microcomputer systems.

"No question about it, we have lost customers to the lower cost of hardware," Goldman remarked in a matter-of-fact voice. "But we have widened our base in terms of the little guys. What we find now is that we have a lot of $600, $700 and $800 per month guys."

For the most part, it is these "little guys" who are the bread and butter of the entire computer time broking industry. For instance, in the early days of the business — roughly the period from 1964 to 1972 — 75% of a firm's time might have been taken up by cavalrytype rescue missions, helping with overnight emergencies or stepping in for a few months.

In the boomtown years — following the 1974 recession and up to and including 1979 — 85% of Time Brokers' total sales volume came from clients who were year-round buyers.

Now, many of the computer time broking customers are first-time computer users as well as a variety of small service bureaus that process a handful of entry-level applications for companies kissed by computers and automation.

Answering the siren's call, many computer time brokerages have retooled to accommodate on-line telecommunications. These applications run the gamut from standard remote job entry (RJE) to on-line debugging and text editing. In 1975, on-line processing accounted for less than 10% of Time Brokers workload, Goldman noted. Now, 50% of the company's current sales involve on-line telecommunications.

Grandfather of Services

Considered to be the grandfather of computer time selling services, Time Brokers was founded when most people bartered for computer time on a you-scratch-my-back-and-I'll-scratch-your-back type of deal. In fact, it took the original owners, Bill Hegan and Svend Hartmann, two years of "missionary work" to build up the fledgling company's sales foundation.

The firm soon expanded to include offices on seven other cities across the country, becoming the first computer time broking organization to have a national network of sales branches. It was also the only company of its kind to go public in 1970 and be offered on the over-the-counter stock market, Goldman added.

However, in 1974, Hegan and Hartmann, the pioneer owners, were bitten by the used-equipment bug and decided to concentrate just on selling second-hand computers. They sold each office of Time Brokers to each branch manager and the rest is pleasant history — especially for Goldman, who runs Time Brokers in New York which claimed 40% to 45% of the original company's total sales volume.

"Now we're making a larger bottom-line profit than the old company made with its eight offices. But, don't tell that to Hegan or Hartmann," Goldman jokingly added.

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Datasaab to 'Humanize' Products for U.S. Mart

By Bob Johnson
CW New York Bureau

NEW YORK — By concentrating on ergonomics, or biotechnology (the study of the relationship between man and machine), Datasaab Systems, Inc. (DSI) hopes to humanize products and convey a feeling of "friendliness" in its marketing plan for the U.S.

The company, which is a subsidiary of a recent merger between Datasaab AB, a computer company, and L.M. Ericsson, a telecommunications company, both in Sweden, manufactures terminals, workstations and financial systems, some currently installed in the U.S.

In a recent discussion here, DSI told of its plans to combine the technologies of the two Swedish companies and strengthen its market position in this country.

People in Mind

A major part of this plan, according to the company, is to produce equipment, especially terminals, with the users' and operators' needs and comfort in mind instead of simply building it in the most economical fashion available.

Datasaab AB President Gunnar Wedell stated that the computer is not an end in itself, but a tool to be used, which is ineffective until it has been loaded with an application program, which is nothing but a model of the user's world. This model is what must be considered when designing systems.

He added, "Our strategy is not to mass-produce cheap products, but rather to achieve volume production of high-quality products."

The ergonomics applied to the production of the companies' products took shape in the form of hiring specialists in the field of hand pressure dynamics, lighting, psychology and more.

As a result of their research a terminal with amber lighting for easier viewing and a specially designed keyboard was created which the company feels is superior in ergonomics over anything in the field.

John Magliana, president of DSI, told of a system that was installed in a major bank in New York where a teller was having difficulty using the terminal because she was used to touching the keys with the eraser end of a pencil so as not to damage her fingernails.

The pressure of the pencil did not allow the machine to function as it was designed to and a problem arose.

Immediate Contact

Magliana immediately contacted his R&D people, who modified the keyboard to accommodate the user. He noted that this is the type of ergonomic consideration DSI will give.

Predicting that ergonomics will be an integral part of the design factors of its major competitors, IBM, Burroughs Corp., NCR Corp., Bunker-Ramo Corp., TRW, Inc. and Olivetti Corp., DSI feels that it now has the competitive edge.

Early this year DSI moved into temporary headquarters in Westchester County, N.Y., and will occupy a three-story, 73,000 sq ft building in Mount Pleasant, N.Y., early in 1982.

Memorex Forms Media Group

SANTA CLARA, Calif. — In a move designed to slash rising costs by reducing overlapping expenditures and working toward greater economies of scale, Memorex Corp. has combined its former Computer Media and Consumer Products groups into the Media Products Group.

Richard W. Martin, former president of the company's Communications Group, has been named to lead the new media group, one consisting of five divisions: Consumer Products and the four former divisions of the old Computer Media Group — Computer Tape, Rigid Media and Components, Flexible Disc and Precision Plastics.

These five groups in 1980 produced approximately one-third of Memorex' total $769 million of revenues, the company said.

"This major realignment of businesses by Memorex brings together two groups whose products involve the same basic resources and technology in an effort to increase the strength and cost-effectiveness of the Memorex media business," said C.W. Spangle, chairman of Memorex.

"The formation of the group is in keeping with previous business realignments to reduce rising costs and provide a central focus in order to do business in today's increasingly competitive worldwide market," Spangle said.

Martin, on his first day on the job, said that the anticipated success of the new group will stem "from the remarkable similarities between the production of consumer products and a computer media piece," adding that increased economies of scale in production will become more apparent as a result of the group merger.

Martin joined Memorex in 1976 as general manager of the Computer Tape Division, becoming vice-president and general manager of the company's Americas and Asia Group in 1977. In 1979 he was named president of the Communications Group.

He will be replaced as president of the Communications Group by Paul L. Klein, former vice-president of marketing of that group.

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Basic Sessions chaired by Walshe and Eisen

The Basic Sessions deal with everything from the need for word processing to cost justification through getting underway, implementing, office communications and management and control for day-to-day operation.

Basic Sessions on the first day will be chaired by Willoughby Ann Walshe, executive editor, *Word Processing Information Systems* magazine and *Information & Word Processing Report* newsletter, published by Geyer McAllister, N.Y.C. The second day chair of the Basic Sessions is Jerrold J. Eisen, president of Offices Sciences International Inc., a subsidiary of Communications Sciences Inc.

Advanced Sessions stress integration

The Advanced Sessions begin with comprehensive work on office automation concepts through problems and solutions and a double session on achieving full integration. There'll be guidance sessions on applications planning, word processing, interface options and even electronic mail.

Norman M. Martin, chair of the first day Advanced Sessions, is president of his own consulting firm and has 25 years experience with word/information/data processing equipment and systems as well as digital data communications. Robert Greenblatt, president of National Word Processing, Inc., a firm specializing in the design and implementation of administrative programs to integrate data processing and word processing, will chair the second day Advanced Sessions.

Session speakers combine years of user wisdom

Session speakers for ISC '81 are: Gerald S. Maskovsky, director of the Office of the Future, consulting in the management consulting service unit of Coopers & Lybrand;Stevan Silva, manager, interactive service division of Management Information Services with the Commercial Union Insurance Company;Sylvia M. Courtney, office automation manager with the Commercial Union Insurance Company;Peter F. Polizzano, vice president, marketing programs for CompuScan, Inc.;Eugene Starr, director of corporate development for ONTEL Corp.; Herbert Lovit, founder and chairman of the board of Communication Sciences, Inc.;Joseph Ramellini, director, advanced office support systems with CBS, Inc.; Patricia Rieno, manager, administrative support service with Olin Corp.; Angelo Cappello, office services manager, Pepsico, Inc.; Herb Fried, systems officer, Citibank of New York, and Lawrence Feidelman, president, Management Information Corporation.

REGISTER TODAY: The Invitational Systems Conference on Word Processing and Data Processing produced by CW Conference Management will be held at the Rye Town Hilton in Westchester County, New York. The conference fee is $295 per person and covers two days of sessions and two luncheons. **For more information or to register call Louise Myerow, Registration Coordinator, on our toll-free number: 1-800-225-4698, ext. 435. In Massachusetts call [617] 879-0700, ext. 435.**

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CW

HP Stockholders Reject Antiapartheid Resolution

By Jeffry Beeler

CW West Coast Bureau

CUPERTINO, Calif. — Owners of Hewlett-Packard Co. stock have overwhelmingly rejected a resolution urging the firm to sever all business ties to South Africa, whose controversial racial policies have drawn worldwide criticism.

By a ratio of more than 10 to one, the stockholders defeated a proposal submitted by the National Council of Churches of Christ (NCCC), which owns some 12,000 shares of HP stock.

Presented Feb. 24 at HP's annual shareholders meeting here, the resolution urged the company to ban all sales of its processors and other high-technology gear to South Africa or any of its agencies. The motion was introduced to protest South Africa's apartheid policy.

In defending the resolution, NCCC spokeswoman Rev. Carolyn Roberts voiced concern that HP's continued product shipments to South Africa were helping to perpetuate a "unique system of racial oppression."

Roberts, a minister with the United Church of Christ, urged HP and its stockholders to follow the lead of companies such as IBM, Burroughs Corp. and Control Data Corp., all of which have already taken steps to tightly control their South African product sales. Although such restrictions stop short of a full-fledged boycott, they do represent an "important first step in ending high technology's role as a friend of apartheid," the NCCC spokeswoman said.

In response to Roberts' remarks, HP cofounder David Packard advised company stockholders to reject the proposed sales ban. Although Packard assured the resolution's backers that he shares their distaste for South Africa's "deplorable" apartheid policy, he voiced doubt that HP could influence the country's actions by cutting off its product shipments.

In fact, the proposed boycott might even prove "counterproductive," he said. If adopted, the NCCC resolution would mean unemployment for the 600 domestic HP workers whose jobs depend directly on continued South African business.

Moreover, an HP-sponsored embargo would only force the South African government to seek its high-technology products from alternative sources, especially the West Germans and the Japanese, "who could care less about human rights," Packard explained.

The HP co-founder expressed hope his company would continue to do business with South Africa and banish all talk of sales embargoes. "I think we can do more good by maintaining a presence in South Africa, where we can exert a positive influence and work for social change," Packard said.

Amdahl Dropped as Witness

By Bob Johnson

CW New York Bureau

NEW YORK — The Justice Department has dropped Dr. Gene Amdahl as a witness in the government's ongoing antitrust trial against IBM.

Stating that the appearance of Amdahl as a live witness could seriously delay the trial, Robert Staal, lead counsel for the Justice Department, expressed concern for a speedy end to the 12-year-old case. "I had to balance the delay of the trial against the importance of Amdahl's testimony," he said.

However, in a recent open court hearing, IBM raised objections to a narrative statement that was submitted by Amdahl in November 1980 in lieu of a live appearance and in consideration of expediting the trial. IBM claimed that the statement is a verbatim copy of a brief given to the Commission of European Communities where administrative proceedings were brought against IBM in December 1980.

Robert Mullen, counsel for IBM, stated that the narrative contains new material and raises questions not included in the government's suit. He said it was absolutely unacceptable to IBM that the witness testify by narrative statement.

At that time, presiding Judge David N. Edelstein decided that Amdahl should indeed appear in person and instructed the government attorneys to produce him.

GSA's Carr to Keynote Computer Law Session

WASHINGTON, D.C. — Frank J. Carr, General Services Administration commissioner of Automated Data and Telecommunications Services, will be the keynote speaker at the Computer Law Association's (CLA) conference on "Government Contracting for ADP" to be held here March 16.

The conference will feature four other speakers. Terry D. Miller will provide an overview of the federal ADP market, David S. Cohen will speak on crimes and contracts, Joan E. Countryman will discuss software procurement, and Terril J. Steichen will address telecommunications procurement.

The conference will be held at the Mayflower Hotel. The registration fee of $60 ($45 for CLA members) includes the luncheon.

Further information and registration forms are available from Daniel T. Brooks, 6106 Lorcom Court, Springfield, Va. 22152.

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Data Processing Division

Memorex Adds Three Vice-Presidents

SANTA CLARA, Calif. — To provide added focus on its end-user data storage equipment, Memorex Corp. has established three new vice-president positions within its Storage Systems Group (SSG).

These executives will direct expanded advanced technology, product development and product planning functions in SSG to accelerate the introduction of high-performance, cost-effective disk drives and controllers, the firm said.

Memorex said it would support these positions with expanded research and development (R&D) funds. Spending this year is expected to exceed the $34.6 million spent on R&D last year.

Frank Sordello, formerly manager of the Recording Technology Center, was named vice-president of recording technology.

In his new position, Sordello will direct the company's thin-film head process and advanced component development program. In addition to being a Memorex Fellow, he will serve as chairman of the newly formed Technical Steering Committee within SSG. This committee will ensure maximum coordination between the company's various thin-film programs and between Memorex and Control Data Corp.

William J. Brown, former manager of development engineering, was named vice-president of development engineering. Brown will be responsible for building a broader engineering base for the company's key recording technologies.

Named vice-president of planning was C. Allan Conover, formerly manager of planning.

Olivetti Buys DTS Stock

MAYNARD, Mass. — Data Terminal Systems, Inc. (DTS) has agreed to sell to Olivetti Co. 625,000 new shares of common stock which should net about $10 million for the financially troubled point-of-sale terminal maker.

Under this arrangement the Italian firm, which also produces electronic cash registers, will receive an 11% ownership in DTS and gain an outlet to distribute its products in the U.S.

The agreement also calls for Olivetti to acquire DTS GmbH, DTS' West German subsidiary, and receive warrants to purchase an additional 500,000 DTS shares within one year.

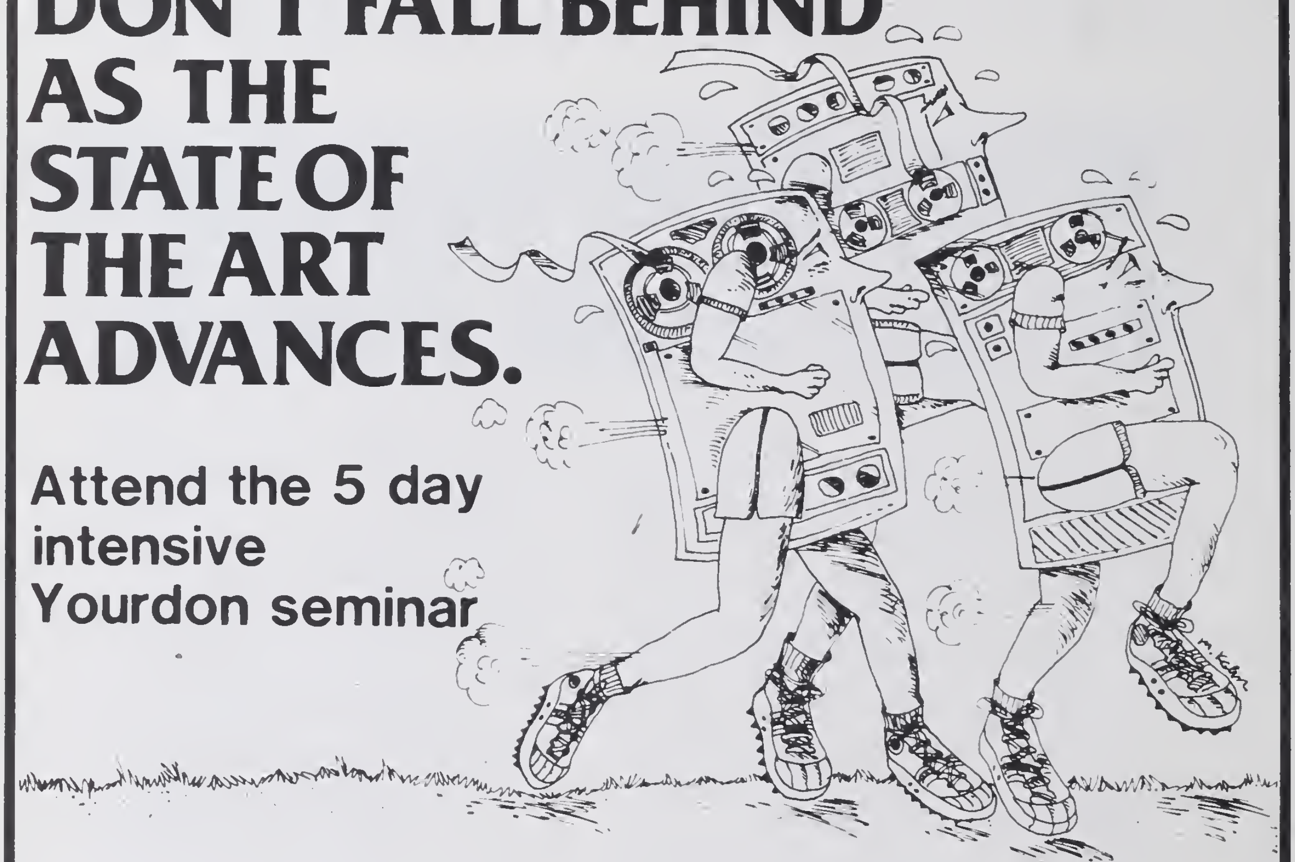
DTS will use the capital to reduce debt that at the end of last year totaled $50 million, compared to $2 million at the end of 1979, DTS said.

In addition, the company reportedly is seeking additional capital by selling off its uncompleted new headquarters building to its neighbor, Digital Equipment Corp. DTS had already spent $10 million on the building. The price of the sale was not revealed.

DTS said its space requirements have been reduced due to slow sales resulting from the current recession.

The company is expected to report a loss for its fourth quarter, but is expected to report a profit for its current fiscal year.

For its third quarter ended Nov. 30, the company's earnings dropped dramatically to $604,000, or 12 cents per share, from $4 million, or 80 cents per share, in the comparable quarter of 1979.



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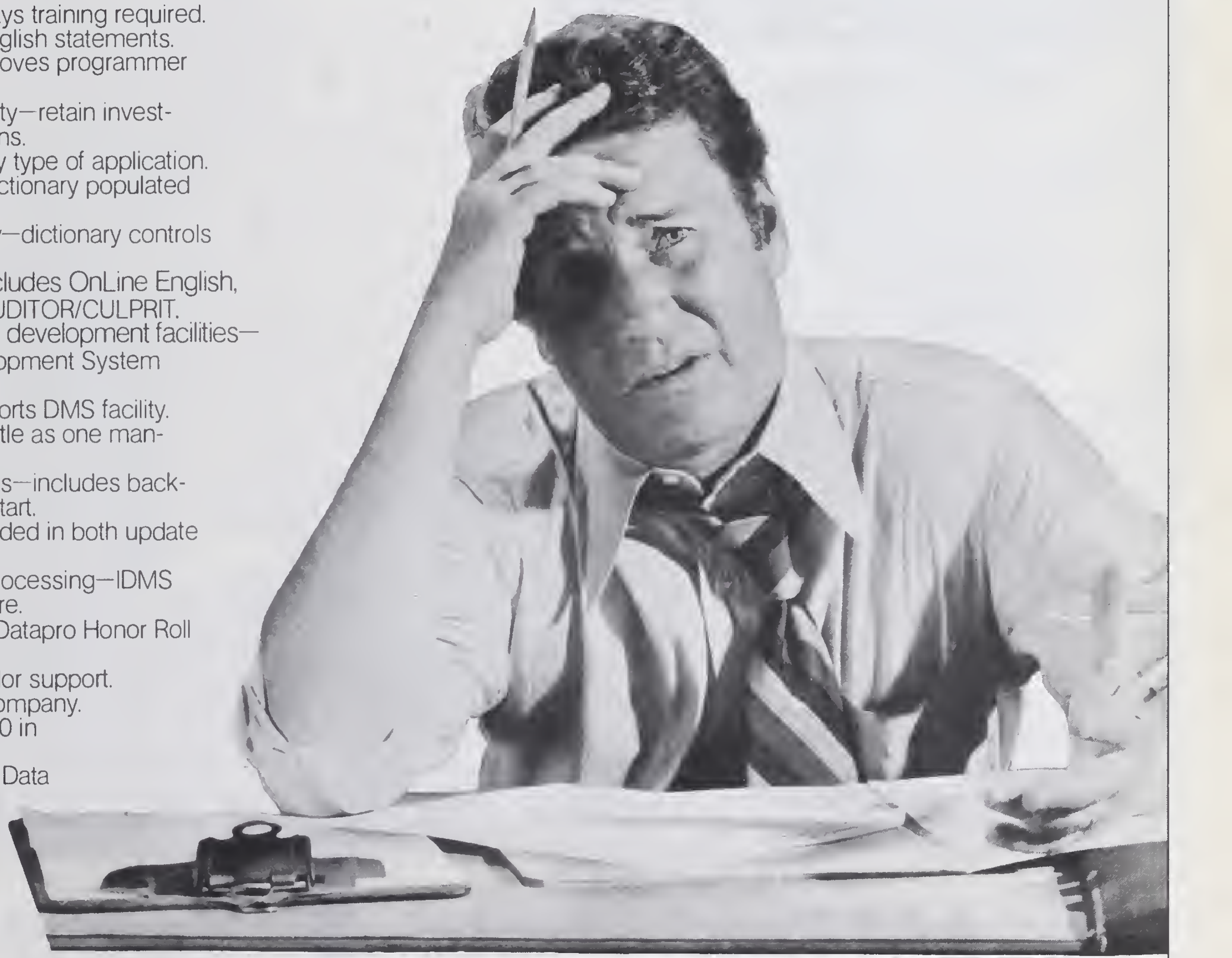

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Supershorts

Hewlett-Packard Co. has unveiled a tiny computer chip, billed to be the most powerful in the world. It is .25-in. on a side, but contains 450,000 transistors inside.

— — —

Intelligent Devices Corp. has announced that Onyx New England, Inc. will become the marketing arm chartered to manage its contract to distribute the C8000 series of micros in the New England region.

— — —

Data General Corp. has established a nationwide manufacturers' network to market its microchip and single-board computer products.

— — —

BSL Technology, Inc. and Computer Sciences Corp. have agreed on the joint development of a laboratory computer. system for use with Computer Sciences Corp.'s hospital information system called Infocare.

— — —

The semiconductor group of Harris Corp. has divided its largest division, the Semiconductor Products Division, into two operating divisions and has established a group operations unit to provide support services.

— — —

Memorex Corp. and Dainippon Ink and Chemicals Corp. have formed a joint venture in the office machine supplies field. The new firm will be called Memorex DIC Corp.

— — —

Digital Equipment Corp. has purchased the 265,000 sq ft manufacturing facility along with 65 acres of land that it has been leasing in Ayr, Scotland, from the Scottish Development Agency.

— — —

Aregon International has announced a joint venture agreement with Telecom Systems Group, Inc. under which the two organizations will market each other's services and collaborate on international joint projects.

— — —

An educational services division has been recently established by Boole & Babbage, Inc. to conduct seminars, workshops, forums and courses in DP performance management, capacity planning and related areas.

— — —

Systems Management, Inc. has authorized Benchmark Computer Systems, Inc. to distribute Systems Management's software and hardware.

— — —

Southeastern Library Network, Inc. and OCLC, Inc. have agreed to a framework in which the two would continue exploring collaborative efforts aimed at providing improved automated services to libraries in the southeast.

— — —

Computervision Corp. of Burlington, Mass., has provided the Worcester Polytechnic Institute with a gift of a Designer IV interactive graphics design system, valued at approximately $350,000, for student use.

— — —

Mohawk Data Sciences has created a new division called MDS Service, which will consolidate the customer service activities of MDS Systems, MDS Trivex and MDS Qantel. It will operate out of the company's executive headquarters in Parsippany, N.J.

— — —

A major restructuring and name change has been announced by Garyco Data Systems, Inc. Effective immediately, that firm will be known as Datavue Corp.

— — —

Solid State Technology, Inc. has authorized Bunson International Co. of Hong Kong to distribute its products in China and parts of the Far East.

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Executive Corner

- The election of Donald J. Massaro as a corporate vice-president of Xerox Corp. was made public recently.
- Dennis Resnick has been elected vice-president for sales at Micropolis Corp.
- Russell S. Dunkle Jr. has been named president of PHD Systems, a subsidiary of AGS Computers, Inc.
- Theodore W. Cook Jr. has been appointed international president of the Ices Users Group, Inc., a worldwide professional computer engineers user organization.
- Fred Bialek has recently been named to the position of president and chief executive officer at Dorado Micro Systems.
- James Trawick has joined Information Consultants, Inc. as vice-president of marketing.
- Telex Computer Products, Inc. has announced the appointment of Edward F. Drohan as vice-president of marketing for its Peripheral Products Division, a newly created position.
- Deltak, Inc. has announced several promotions in its organization: Ken Hunt has been named group vice-president of sales and marketing; Dan Brosnan, vice-president international/general manager; Bruce Buteyn, vice-president of sales; Rich Ream, vice-president of sales support; Doug Smith, regional vice-president; Bob Bowers, vice-president of planning; and John Kernan, vice-president of product development.
- The board of directors at Tandem Computers, Inc. has announced the election of Charles W. Ryle to the corporate office of vice-president.
- Francis Castaignede has been promoted to vice-president of European operations at Tesdata Systems Corp.
- P.E. (Bud) Cook has been appointed vice-president of marketing operations/east of the Data Processing Division of IBM.
- Neal Hales has been named vice-president of marketing at National Technology.
- Dave Evans has been promoted to the newly created post of vice-president of interactive terminals for Harris Corp.'s Data Communications Division.
- Standard Logic, Inc. has announced the appointment of five vice-presidents as the first step in a major long-planned expansion program in the restaurant point-of-sale market: J.C. Capraro, vice-president of new product development; R.J. Feely, vice-president of sales; D.L. Schnitter, vice-president of marketing; G.L. Ford, vice-president of finance; and N.L. Kreuder, vice-president of operations.
- Graham Holland has been elected a corporate vice-president and general manager of the Data Communications Division of the Penril Corp.

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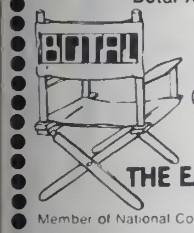

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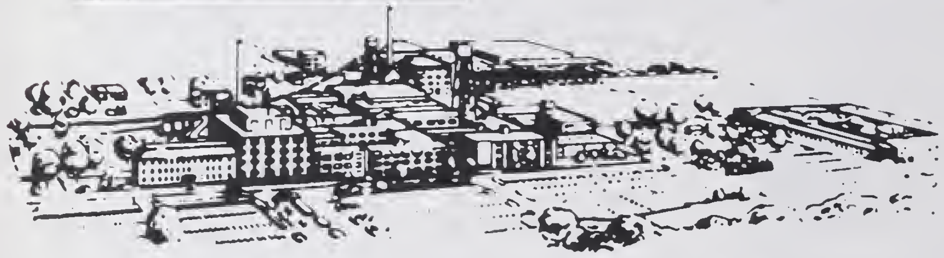

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Northern Virginia & Saudi Arabia

The Systems International Division of Computer Sciences Corporation, headquartered in Northern Virginia, is currently engaged in the design, development, implementation and ultimate turnover of a vast computer/communication system in Saudi Arabia.

A major element of this program is computer maintenance. We are currently seeking Engineers to install and maintain digital computer and communication equipment. Experience on UNIVAC 1100 series computers (preferably 1100/80) highly desirable. Positions are available at our facilities in Herndon, Virginia and Saudi Arabia.

These are permanent positions and offer attractive salaries along with an excellent benefits package.

For immediate consideration please call or send your resume to: Jan Lilac, Personnel Administrator, (703) 471-3188.

The only limitations are the ones you bring with you.

CSC

Systems International Division
3001 Centreville Road
P.O. Box 745
Herndon, Virginia 22070

An Equal Opportunity Employer M F H

CLASSIFIED ADVERTISING ORDER FORM

Computerworld's Classifieds work.

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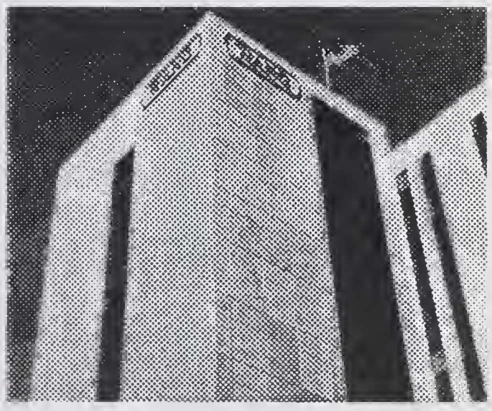
____

Telephone: ____________________

Send this form to:
CLASSIFIED ADVERTISING, COMPUTERWORLD
375 Cochituate Road, Route 30, Framingham, MA 01701

Wang 2200 Development



AT WANG YOUR FUTURE IS HERE TODAY.
Wang is a world leader in office automation. We're growing faster in information processing than any other company in the industry. All of which could mean faster movement for your career. At Wang, you'll work in an environment where your ideas can flourish. Our business is high technology but our best ideas are you.

LANGUAGE DEVELOPMENT

Openings exist at both the entry and senior levels in the design, development and support of microprogrammed language interpreters for Wang 2200 minicomputers. Functional enhancements are currently being made on an advanced BASIC and the development of a COBOL processor. Emphasis is on development of a high-performance interactive system for the small business and distributed processing markets.

A small group environment provides the opportunity for a high level of individual responsibility and visibility. Interaction with all 2200 Development groups is encouraged.

The candidate should have a technical degree; 1-5 years assembly or microprogramming experience; knowledge of BASIC, COBOL, and interpreter design; and an understanding of operating systems.

SYSTEMS PROGRAMMERS

We are developing database and distributed processing services for our 2200 Series, which is aimed at the needs of small business and demands many innovative solutions. Several end-user oriented products are being developed based on data dictionary technology. They are aimed at providing ease of use and flexibility for the user and addressing the integration of data with text processing. These products include query processing, high-level data access, and recovery of system resources.

Individuals will work in a small team environment with an opportunity to participate in all phases of development and make their contributions visible. We are seeking individuals with development experience in file management, database and end-user oriented software.

SYSTEMS I/O DESIGNER AND PROGRAMMERS

We have several positions open in a group which designs and implements firmware for new I/O devices and interfaces. These interfaces will be progressively more intelligent, distributing the burden of a multiprogramming operating system, and providing more high-level features than ever before on our powerful small business computer. You will work in a small interactive group with vertical systems responsibility. Coding will be at a number of levels, including high level language, interpreter microcode, operating systems microcode, microprocessor code, and hardware sequencer instructions. Responsibility will range from language definition through hardware specification. All phases of design, coding, and debugging are included. We provide a good opportunity to understand an entire product.

At entry-level candidate requires a degree in engineering, computer science, or math with adequate course work in operating systems principles. A senior level candidate requires several years' experience in either operating systems or microprocessor firmware design, preferably both. Some hardware background is very helpful, but direct digital design experience is not a prerequisite.

REMOTE DIAGNOSTICS SOFTWARE ENGINEERS

We seek Project Leaders and Team Members to work together in our Small Business Systems Software Development Group. Your prime focus will be to identify and mold this increasingly important area.

Project Leader positions require a BSCS or EE degrees plus 3-5 years experience with hardware diagnostics. An advanced degree would be a definite plus.

Team Member candidates must meet the same educational requirements and have 1-3 years experience in hardware diagnostics. Knowledge of microprocessors and hardware is preferred.

Please send resume, including salary history to. Tom Bahlo. Professional Recruiter, Wang Laboratories, Dept. CW-39, One Industrial Avenue, Lowell, MA 01851.

WANG

Making the world more productive

©1981 Wang Laboratories, Inc., Lowell, MA 01851. We are an affirmative action employer.

ASSISTANT DIRECTOR FOR ADMINISTRATIVE COMPUTING

New Mexico State University is searching to fill the top position in Administrative Data Processing. This position reports to the Director of the Computer Center and is responsible for all administrative software development and production for the University. NMSU supports a heavily ON-LINE IBM software environment and this position includes the responsibility of moving toward a Data Base system. Direct supervision of the management of all applications for ADP as well as development and planning are centralized in this position.

The position can pay from $30,000-$37,000 annually for a qualified candidate. Requirements include a master's degree in a field relating to computing or a bachelor's degree with additional experience. At least six years experience in administrative data processing are required, two of which must be at the managerial level. IBM software experience is a plus. NMSU has a hardware center with an AMDAHL V/5, and IBM 4341, and over 300 terminals.

Deadline for applications: March 15, 1981. Send resume with letter of application to Dr. Joseph R. Denk, Director of Computer Center, NMSU Computer Center, Box 3AT, Las Cruces, NM 88001.

NMSU IS AN EQUAL OPPORTUNITY/ AFFIRMATIVE ACTION EMPLOYER

Hardware/MSEE BSEE/Software

If you have 1 or more years experience in any of the following areas: Electrical Electronic, Analog-Digital Ciruits, Systems Design or Development, Mini-Micro Processors, Project, Process, Test Controls or Instrumentations and possess a BSEE and or a MSEE and would like your career handled by a service that specializes exclusively in Electrical Engineers on a nationwide basis then send your resume in confidence to:

SOUTHERN ENGINEERING SERVICES
P.O. BOX 2045
SARASOTA, FLORIDA 33578.

"A PERSONAL SERVICE FOR ELECTRICAL ENGINEERS"

SYSTEMS ANALYSTS AND PROGRAMMERS FOR SUNBELT LOCATIONS

Job dissatisfaction, complacency, and frustration are the biggest obstacles to overcome to achieve one's career goals. Everyday new career opportunities pass us by because we are unaware of their existence. Let us keep you abreast of what your true value is in the market place. Absolutely no obligations, please call Keith Reichle, Data Processing Specialist

Dunhill
of CHARLOTTE INC
One Fairview Plaza Suite 406
5950 Fairview Road Charlotte NC 28210
704 554 8771

DIRECTOR SOFTWARE & OPERATIONS TO $50,000

Major, prestigious Medical Center in desirable California location seeks Director, Software and Operations to effectively integrate the systems programming and data center functions. Reqires at least ten (10) years D.P. experience from large scale data center, state-of-the-art knowledge of hardware/software, and current experience with on-line systems, d.b. techniques, and back-up system concepts. Superior benefit package, including four weeks vacation, 1st year. Reply to:

Western Health Resources
PO Box 48919
Los Angeles, California 90048

SYSTEMS ANALYSTS PROGRAM ANALYSTS

The North Carolina Baptist Hospital/Bowman Gray School of Medicine Computer Center is seeking qualified candidates for the positions of Systems Analyst and Programmer Analyst to assist in the development and maintenance of various management information systems. Three years previous medical and/or educational experience required for both positions. Honeywell L66 experience a plus. Send resume with salary history and requirements to: **Systems Manager, Medical Center Computer Center, 300 South Hawthorne Road, Winston-Salem, North Carolina 27103. EEO.**

EDP OPPORTUNITIES *COAST TO COAST*

Robert Half, staffed by EDP professionals for EDP professionals with 70 offices throughout the U.S., Canada & Great Britain, is the largest network of personnel consultants in the Data Processing field. And its establishment in 1948 also makes Robert Half the oldest. One call and you can search the local, national and international markets. All fees are paid by client companies, of course. The following is a partial listing of opportunities and locations:

BOSTON

OS/MVS SYS PROG

Prestigious expanding elect mfr seeks hvy with exp in MVS internals, t/p, access methods & sys perf monitoring. IBM 3032 OS/MVS, IMS, TSO/SPF environ. Will be involved in state-of-the-art conceptualization. Salary **$34,000** range

SR MFG ANALYST

Central Mass Fortune 500 co has new opening for seasoned MRP consultant to implement full complement of on-line mfg sys. Hvy user & exec interface. Will also manage small tech staff. Salary **$35,000**

SYSTEMS PROG — CAPE COD

Nat'l recognized mfr seeks tech-oriented indiv with sysgen & system software enhancement exp for major upgrade to IBM 4300. CICS exposure highly desirable. Outstanding tech challenge in excellent work environ. Ocean view from your office. Salary **$26,000**

EDP AUDIT SUPV — N H

Leader in fin'l services ind req mgr to direct small EDP audit staff. Must know EDP audit techniques & COBOL. Possible trvl to Europe & S America. Co located in rural, country setting. Salary **$30,000**

SYS-38 IMPLEMENTATION

Mid-size growing terminal mfr seeks "shirtsleeve type" indiv with SYS-34 or 38 knowl to lead upgrade effort. RPG-III environ. Excellent benefit program. Salary **$28,000**

PL-1 ANALYST/PROG

Large state-of-the-art IBM installation req detail-oriented indiv to design new bus systems. Must have hvy develop & proj mgmt skills. PL-1 req. Career path to proj mgr. Salary **$25,000**

IBM SERIES/1

New opening as a result of technological growth req IBM Series/1 sys prog to design networks & impl distributive proc nationwide. Well-established fin'l services co. Will work in highly prof environ. Salary **$27,000** range

Gerry Battista
ROBERT HALF
of Boston, Inc.
100 Summer Street
Boston, MA 02110
(617) 423-1200

TULSA

SOFTWARE MGR

Major oil co seeks supervisor with exp in development and implementation of system software. This co operates under OS 370/MVS/IMS environment. **$45,000**

ROBERT HALF
of Oklahoma, Inc.
5840 S. Memorial Dr., Suite 217
Tulsa, OK 74145
(918) 627-1600

PROVIDENCE

ONLINE PROGRAMMER

Prominent RI mfr involved in extensive CICS systems devel. Fin'l sys bkgrd helpful. IBM DOS/VS environ. Salary to **$27,000**

IMS DESIGNER

Hi-tech mfr seeks sr analyst to design IMS apps. DL/1 CICS & COBOL desired. 3031 DOS/VS environ. Career growth to project leader. Salary **$26,000**

INSURANCE ANALYST

Major ins co seeks sr prog/analyst with solid OS COBOL skills. Ins apps exp desired. Salary to **$26,000**

SENIOR PROGRAMMER

Rapidly expanding mfr seeks sr programmer with proven COBOL & RPG II skills. On-line communications bkgrd helpful. Salary to **$25,000**

RETAIL PROGRAMMER

Professional systems environ for dynamic D P "pro". COBOL or IBM Assembler skills req. Project leadership oppty. 4341 environ. Salary to **$24,000**

COPICS ANALYST

Leading mfr installing COPICS. Extensive mfg apps exp essential. DL/1 & CICS bkgrd a +. Salary **$24,000**

COBOL PROGRAMMER

Nat'ly recognized co seeks COBOL programmer with mfg apps exp. Order entry devel. Salary to **$21,000**

Bob Lathrop
ROBERT HALF
of Providence, Inc.
400 Turks Head Bldg.
Providence, RI 02903
(401) 274-8700

ATLANTA

PROGRAMMER/ANALYST

Fast-pace professional atmosphere with large Financial Institution. Need large IBM experience in an OS environment. Experience with CICS preferred. Excellent project leadership potential. **$25,000**

SYSTEMS PROGRAMMER

Advancement opportunity with Fortune 500 textile manufacturer. Requires 2+ years IBM experience, MVS and CICS are strong pluses. Direct programmers on technical operations. **$30,000**

DATA BASE ANALYST

Project leader to work independently at client site. Develop new State-of-Art Data Bases. Engineering experience helpful but not required. Permanent location with high level multi-faceted computer service firm. **$35,000**

Charlie Wexler
ROBERT HALF
of Atlanta, Inc.
3379 Peachtree Rd. N.E.
Atlanta, GA 30326
(404) 266-2153

HARTFORD

SR SYSTEMS ANALYST

Conn multi-div corp expanding new dev projects. COBOL trained prog/analysts with gen bus sys exp & analysis potential qualify for multiple openings. Salaries to **$28,000**

MGR TECH SERVICES

NY metro opening for indiv to direct small IBM software group. Must have extensive tech bkgrd. Salary to **$46,000**

DIR SYSTEMS

N East metro area client seeking top exec to direct ins, health care-oriented services firm. Salary to **$50,000 +**

SR SYSTEMS PROG

Tech consulting role with Conn based nat'ly prominent firm. Seeking bkgrd supporting CICS software & apps in DOS or OS environ. DMS/VS a +. Campus-like suburban facility. Salary to **$32,000**

PROG ANALYST — INS

Outstanding oppty to join successful team with ind ldr. IBM OS COBOL bkgrd req'd. Pref P/C or Life apps exp. New development underway. Strong corp project commitment. Hartford based co. Salary to **$24,000**

T P PROJECT MGR

One of the strongest co's in fast growing Conn area. IBM Data Comm bkgrd mandatory for voice, data & video comm project utilizing satellites. Highly visible role. Salary to **$35,000**

DATA COMM'S SUPPORT

E Coast openings lge nat'l vendor of IBM-compatible hardware/software products. Client offers long term growth, visibility & prof career development. Starting salaries to low **$30's**

Stan Durbas
Paul Meissner
ROBERT HALF
of Hartford, Inc.
111 Pearl Street
Hartford, CT 06103
(203) 278-7170

TAMPA

PROG/ANAL

Leader in field has need for Sys 34-RPG2 — on-line. **$17,000**

PROG/ANAL to SYS/ANAL

We have so many DOS/VS that we can't count them all. If you have any exp call us. **$14-26,000**

PROG/ANAL to SYS/ANAL

New hardware — New position 4341 — OS — MVS — From prog/anal to analyst & sys prog. **$17-28,000**

Stan Allen
ROBERT HALF
of Tampa, Inc.
1311 North Westshore Blvd.
Tampa, FL 33607
(813) 876-4191

BUFFALO

SR ANALYST

Div of lge mfg co needs top notch analyst for hi-visibility pos. IBM state-of-the-art environ utilizing MVS, JES 3. Resp include mfg sys maint, design & implementation; i e MRP, invty control, shop floor scheduling. Rpts to mgr sys planning. Salary **$30,000**

SYSTEMS ANALYST

Degree req for this user liaison pos. Must have solid analytical bkgrd in bus apps to define mgmt sys req. Tech bkgrd in CICS, DL1 or TOTAL ideal. COBOL/DOS musts. Salary **$28,000**

DP MANAGER

Exceptional oppty for shirtsleeve mgr with strong RPG II prog. Will handle day-to-day oper, prog, design & implementation of all sys + managing intimate staff. Sys 34 installation. Salary **$25,000**

ANALYST PROGRAMMER

Expansion pos for multi-plant div of lge conglomerate. Resp incl developing prog specs for new & existing sys in mfg, fin, or mktg areas. On-line CICS, TSO & IMS are perfect fits. COBOL a must. Salary **$25,000**

SYSTEMS ANALYST

Fin'l inst loc in Western NY needs proj mgr to aid in implementation of new computer ctr. On-line communications & COBOL musts. Banking apps the key. Salary **$32,000**

Pam Siegal
ROBERT HALF
of Buffalo, Inc.
1310 Liberty Bank Bldg.
Buffalo, NY 14202
(716) 842-0801

CHICAGO

PROGRAMMERS COBAL BAL

Your career path broadens with the solid growth pattern of this company. Your OS and DOS experience on large IBM equipment qualifies you for CICS training. Any TSO/SPF, or Panvalet is a plus. IBM 3033 OS/MVS and 370/168/158 support a large telecommunications network. Company is committed to the maximum development of the professional staff. **$23,000**

Bob Hendrix
ROBERT HALF
of Chicago, Inc.
35 E. Wacker
Chicago, IL 60601
(312) 782-6930

SEATTLE

Leading Northwest firm seeks new breed of D P auditors. Several openings. Need 1+ yrs COBOL IBM 370 experience, consulting image, good accounting skills. CPA, DYL-260 a plus. Must travel. Starting salaries to $24,000. plus liberal travel allowance.

Anchorage, Alaska banks are expanding fast and seek experienced IBM OS or Burroughs MCP COBOL banking veterans for positions from programmer to project leader and D P auditor. To **$40,000**

Ray Magill
ROBERT HALF
of Seattle, Inc.
1301-5th Avenue
Suite #2626
Seattle, WA 98101
(206) 624-9000

ST. LOUIS

IMS SPECIALIST

Consulting firm seeks experienced IMS internals specialist to advise clients on data base application and performance. Not a DBA position. Must have several years experience with IMS internals, interface. Excellent Growth! To low **$30's**

DATA BASE ADMINISTRATOR

Classical DBA position, newly established. IBM 4300 environment. DL1 preferred, but any strong data base experience considered. To **$30,000**

SENIOR PROG/ANAL

At least 2 years COBOL, IBM OS/DOS environment. New position in expanding, large 370 shop. To mid **$20's**

Charles Shaffer
ROBERT HALF
of St. Louis, Inc.
7733 Forsyth Blvd.
St. Louis, MO 63105
(314) 727-1535

PORTLAND

PROG/ANALYST

Progresive Portland based client seeks 5-7 yrs IBM-OS, COBOL, DBMS. Requires project mgmt expr with solid communication skills. Salary **$22-27,000**

SYSTEMS ANALYST

National mfgr seeks 4-6 yrs OS/MVS, COBOL experience. Must have heavy user interface & strong analysis + system design under IMS-DL/1. Salary **$25-30,000**

SR PROG ANALYST

Established Portland firm with IBM-DOS on-line environment seeks 2-3 yrs ASSEMBLER and/or COBOL. Requires strong analysis & design with user interface. Flex-time. Salary **$21-26,000**

Bob Clawson
ROBERT HALF
of Portland, Inc.
1 S.W. Columbia
Portland, OR 97258
(503) 222-9778

COLUMBUS

SENIOR PROGRAMMER

A solid career position for an individual with at least 2 years experience in manufacturing and a strong COBOL applications track record. A 2 year degree in computer science or equivalent experience. Salary **$15-21,000**

SYSTEMS PROGRAMMER DOS

A technical position offering a challenge to those knowledgeable of TOTAL. Four years experience in Data Processing with at least one year in-depth knowledge of Systems Software and maintenance. Experience with CICS a definite plus. Degree necessary. Salary **$17-24,000**

DATA COMMUNICATIONS ANALYST

A newly created position where you will play a vital role in the performance appraisal and maintenance of all data communications and some applications experience will be necessary. Knowledge of CICS and Power VS a plus. Degree necessary. Salary **$19-27,000**

Kurt Hopwood
ROBERT HALF
of Columbus
88 East Broad St., Ste. 1150
Columbus, OH 43215
(614) 221-9300

ROBERT HALF

ACKSONVILLE

SYSTEMS PROGRAMMER

Large Jax based corp seeking individual experienced in generating and maintaining operating systems. The professional's background should include IBM OS MVS. Pluses would include experience in JES2/JES3, TSO MVS/SE. Fee pd by Mgt.
Salary **$24,000**

ROBERT HALF
of Jacksonville, Inc.
9550 Regency Square Blvd.
Suite 213
Jacksonville, FL 32211
(904) 721-0970

LBUQUERQUE

IBM LARGE SCALE

Major energy related co seeks programmer/analysts, financial applications. IBM 4341 in COBOL, IMS and CICS.
Salary **$18-25,000**

BANKING

Expanding bank group seeks programmers with COBOL exp, any hardware. Banking applications. Salary **$18-22,000**

Dick Sternes
ROBERT HALF
of New Mexico
P.O. Box 3320
Albuquerque, NM 87190
(505) 884-4557

SOUTHERN CALIFORNIA

LOS ANGELES

PROGRAMMER ANAL

Our client requires 3+ yrs COBOL in a manufacturing or distribution company environment. Currently converting from DOS to OS MVS. You will be trained in IMS DB/DC. Relocation costs will be reimbursed to out of town applicants. Fee Pd.
To **$33,000** + bonus

Duncan White
ROBERT HALF
of Los Angeles
3600 Wilshire, Suite 2000
Los Angeles, CA 90010
(213) 386-6805

COMMERCE

PROGRAMMER/ANAL MANAGER POST OPEN

Our client requires 2+ yrs COBOL/BASIC. Initial assignment includes heavy maintenance and documentation and hen grow into management. ee Paid **$25-30,000**

Bob Dack
ROBERT HALF
of Los Angeles
6252 E. Telegraph Road
Commerce, CA 90040
(213) 721-2197

ORANGE COUNTY

EWPORT BEACH

MIS DIRECTOR

een manager with strong lanning skills plus solid usiness systems knowledge. OBOL, wide hardware background best for this super aggressive, fast-paced ASE sted firm. Fee Paid.
$45,000 + BONUS

Dave Ankenbrendt
ROBERT HALF
of Orange County
2333 N. Broadway, #200
Santa Ana, CA 92706
(714) 835-4103

MINNEAPOLIS/ ST. PAUL

DIRECTOR OF DATA PROCESSING

NEW EXCLUSIVE LISTING! Our client has begun a search for a solid DP professional to head up their MIS dept. Desired bkgd includes extensive exp in a mfg environment, hardware conversions and mgmt exp at the senior level. You will be responsible for bringing this co's DP efforts to a sophisticated distributed network. Excellent staff. Highly visible upper mgmt position. Solid commitment from top mgmt.
Salary to **$60,000**

SYST & PROG MANAGER

Fast growth consulting firm in the TC is seeking an individual to be resp for their new systems development. They perfer an MBA with 5+ yrs of systems design and mgmt. Your bkgd should include mini exp, preferably DEC, accounting and financial systems design and a low turn-over rate as a mgr. Reports to President.
Salary to **$45,000**

CONSULTING MANAGER

Excellent opty to get in on the ground floor with an outstanding CPA firm. This new dept within a strong national firm will require a shirtsleever to start the dept. Requirements are an MBA, CPA consulting exp, knowledge of the mini market and a strength in financial and mfg applications.
Salary to Mid-Upper **$40's**

Ron Dykstra
ROBERT HALF
of Minnesota, Inc.
2236 IDS Center
Minneapolis, MN 55402
(612) 339-9001

Specializing in E.D.P.
positions (not just jobs).

FORT LAUDERDALE

PROGRAMMER/ANALYST

Billion dollar financial Corp expanding their Data Processing Dept. State-of-the-Art NCR installation looking for several Analysts with NEAT III, on-line experience. Extraordinary benefit package. Excellent visibility. Opportunity to start your Florida career with an established and respected Corp.
Salary **$24,000**

Chuck Neil
ROBERT HALF
of Miami, Inc.
1395 N.W. 167th Street
Suite 100
Miami, FL 33169
Broward (305) 764-1550

MIAMI

SR SYSTEM ANALYST

Major International Corp is actively seeking a D P Professional with strong business and technical background. The key to this outstanding position is financial system design in a large IBM environment using IMS data base. Excellent benefit program with a defined career path for the ambitious person.
Salary to **$30,000**

Chuck Neil
ROBERT HALF
of Miami, Inc.
1395 N.W. 167th Street
Suite 100
Miami, FL 33169
Dade (305) 625-5433

DENVER

MANAGER

Large national manufacturing firm currently seeks a systems manager for its Colorado division. Must have extensive development background in large scale manufacturing applications. Requires knowledge of online systems and prior mgmt experience.
Start **$40,000**

ANALYSIS

Rapidly growing Denver based co needs a systems analyst with knowledge of the design and implementation of accounting systems. Must have a COBOL background and at least 3 yrs experience. Company seeks a person that can grow into mgmt.
Start **$26,000** range

Steve Newman
ROBERT HALF
of Denver, Inc.
2 Park Central
Denver, CO 80202
(303) 629-1010

DALLAS

CICS

Shop putting up first on-line systems. Need experienced programmer analyst with 2 yrs DOS COBOL. To **$25,000**

IMS

Client heavily committed to IMS Systems. Presently putting up several new data base systems. Need 3 yrs IMS, OS, COBOL. To **$28,000**

SYSTEMS

Company forming support group. Need MVS and IMS software and applications people. Ground floor opportunity.
To **$29,000**

John Stalger
ROBERT HALF
of Dallas, Inc.
Two NorthPark E., #750
Dallas, TX 75231
(214) 363-3300

SAN ANTONIO

PROGRAMMERS

Degree preferred, 2+ yrs exp in IBM/COBOL environment a MUST. Financial, on-line exp and analytical talent a PLUS. Salary is DOE. Good benefits and superb growth/earning potential. **$16-20,000**

DATA PROCESSING MGR

Degree, 10+ yrs in management, Financial exposure a MUST. IBM center 370, 4341, COBOL, on-line 2 million + budget, 65 person staff. Progressive company seeking individual with exceptional skills in policy, people skills and diplomacy. Highly visible.
$ Open

SYSTEMS ANALYST

Degree preferred, 8 plus yrs in D P with last 4 Sys/anal. RPG II, IBM/370 DOS environment a MUST. No coding. Contact between S&P Mgr and Client base. Growth & benefits are exceptional. **$18-20,000**

PROJECT LEADER

Degree preferred, Financial, Acctg, Design of 8 yrs plus a MUST. This position is to develop from ground up systems for management and oversee programming staff from start to finish. **$25,000** up

Bob Beldeuf
ROBERT HALF
of San Antonio, Inc.
#850 First Nat'l Bank Bldg.
San Antonio, TX 78201
(512) 736-2467

KANSAS CITY

SR MIS PLANNER

Newly created corporate planning function seeks an experienced MIS Planner. Become immediately involved in long range planning, feasibility studies, and project planning. Prior experience in large scale systems and hardware evaluation required. Good verbal and written communication skills a must. Excellent visibility to major corporate execs with promotion possibilities throughout the whole corporation.
Salary to **$35,000**

SYSTEM/ANALYST

Five year solid business/commercial analysis and implementation experience on IBM 370/OS hardware with a degree required. Take charge of major new development project for fast expanding department in Kansas City Corporate headquarters. No programming required but knowledge of COBOL is necessary. Person will work with multiple users and build his own project team.
Salary to **$32,500**

SOFTWARE

Leading edge opportunity for the experienced DOS/VS professional. Person must be capable of doing DOS/VS GEN as well as CICS and DL/1 support. Exposure to VSE would be a plus. Must be capable of taking complete charge of all DOS/VSE software in new 4341 installation. Salary to **$32,000**

SR PROG/ANAL

Due to expansion, Fortune 500 company offers unique chance for the experienced programmer/analyst to expand their technical horizons. Qualified candidates will have a minimum of 5 years D P experience with knowledge of on-line, data base, and a high level language. Individual will participate in the development and design of new manufacturing and accounting systems. Excellent benefits. Salary to **$27,000**

RPG II

Rapidly expanding system 34 shop seeks ambitious individual with RPG II skills. Knowledge of OCL, $ utilities, tables and arrays required. Pleasant atmosphere and excellent benefits.
Salary to **$25,000**

George Waterman
ROBERT HALF
of Kansas City, Inc.
127 W. 10th
Kansas City, MO 64105
(816) 474-4583

MILWAUKEE

PROGRAMMER ANALYST

Knowledge of NCR 8200 or 8400 using IMOS or IRX. Will get acquainted with IMCS. VRX will be a strong plus. NEAT/VS; COBOL.
$20-23,000

PROGRAMMER/ANALYST

Energetic candidate can do their thing by using Series I & EDX expertise. This is that favor you owe yourself.
$26-30,000

PROGRAMMER/ANALYST

COBOL & good experience. Will design and install systems. MRP know-how required. CICS and DB/DC helpful; 370 & 3031 DOS/VSE.
$25-28,000

Tom Thorsted
ROBERT HALF
of Wisconsin, Inc.
777 E. Wisconsin Avenue
Milwaukee, WI 53202
(414) 271-HALF (271-4253)

NEW YORK

DOS/VSE CICS INTERNALS

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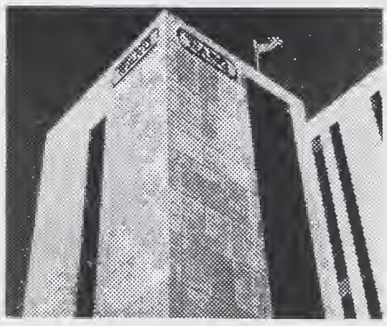

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Programmer sought to fill temporary "03" Professional position. Must have experience in programming. IBM OS COBOL and JCL experience on administrative applications preferred. Must show ability to acquire and use technical skills independently. Online programming (CICS preferred) also Data Base expertise (System 2000). Must have analysis and design skills and ability to interact with users. Experience in Data Dictionary (DATAMANAGER) preferred. Bachelor's Degree in Computer Science or business course work preferred. This flexible position carries no benefits. Starting salary will be commensurate with experience. **Send resume by March 30, 1981 to Data Processing Center, 150 Whitmore, University of Massachusetts, Amherst, MA 01003.** The University of Massachusetts is an Affirmative Action/Equal Opportunity Employer.

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Minimum of five years experience required in responsible management of an academic-scientific computing facility involving large-scale systems. Additional five years experience in some place of operation, application, research or specific management of computing activity preferred. Salary commensurate with experience: $40,000 to $50,000 range.

Application deadline March 30, 1981. To apply, submit a resume along with a letter of application to: Dr. George Olson, Vice President for Research, Colorado State University, Fort Collins, CO 80523

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Ford Aerospace & Communications Corporation
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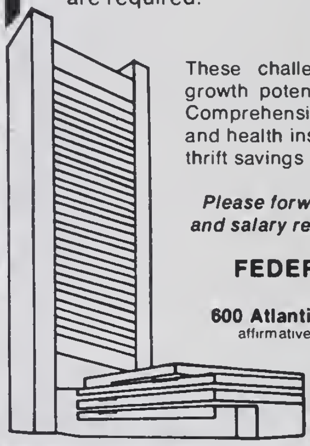

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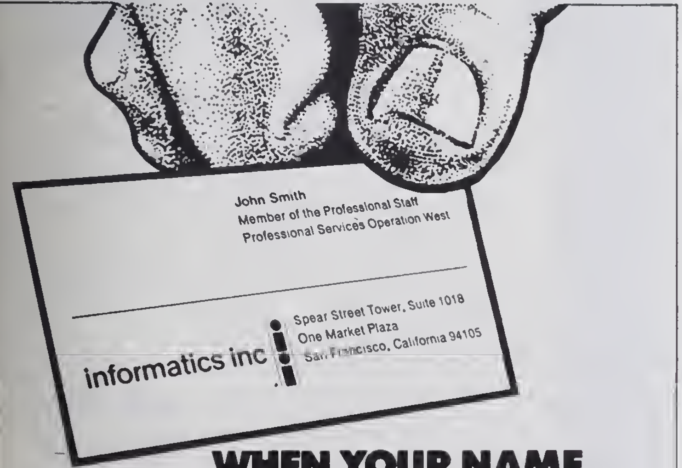
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EOE, M/F.

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EEO, M/F, VET

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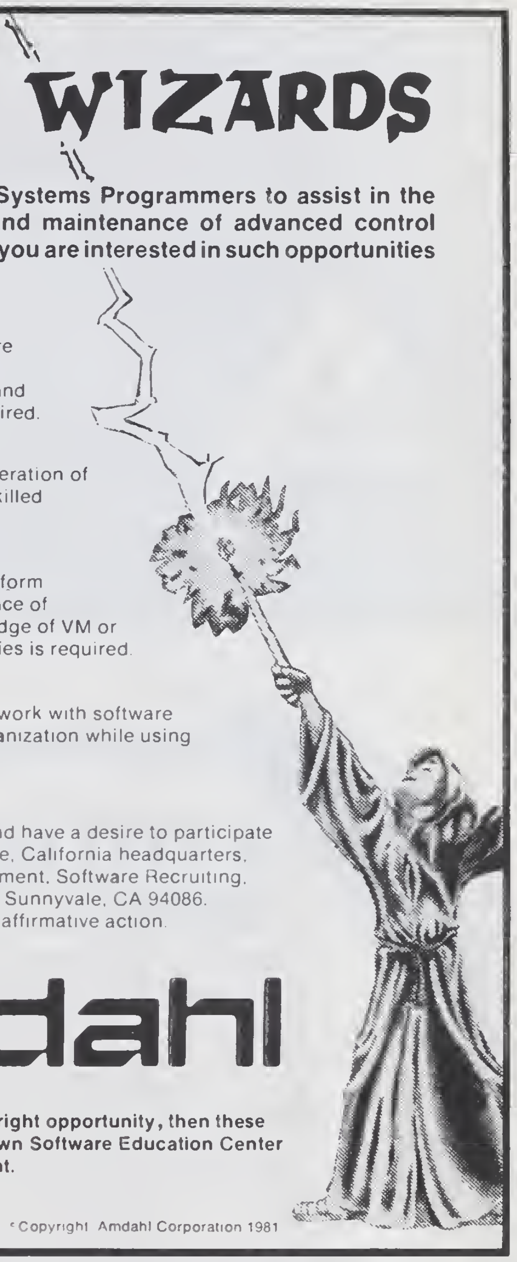

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EOE M/F/H

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COMPUTERWORLD

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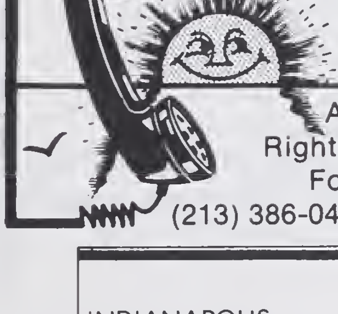

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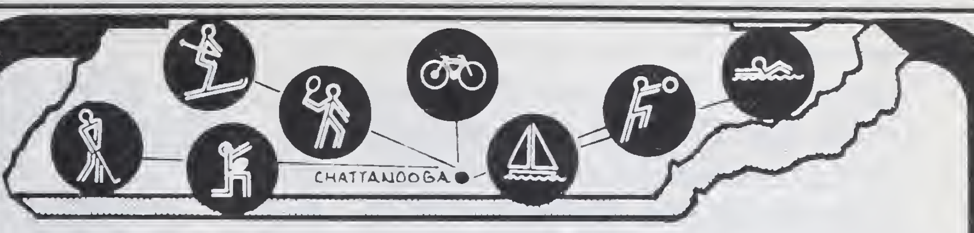

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Request for proposal No. 632 due 3:30 p.m., Tuesday, March 31, 1981, for a disk upgrade & trade-in for a Four-Phase IV/65 systam.

Request for Proposal No. 633 dua 3:30 p.m., Thursday, March 26, 1981, for the acquisition of saveral used IBM 3742 off-line data antry stations.

Request for Proposal No. 634 due 3:30 p.m., Tuesday, March 31, 1981, for the purchase of mamory, printer, communications capability and softwara for an existing UNIVAC V77/600 system.

Request for Proposal No. 635 due 3:30 p.m., Thursday, April 9, 1981, for the acquisition of 6250 bpi magnetic tape drives and controllars for operation in an existing Amdahl V6/II-IBM 370/158 multiprocessing environment.

Request for Proposal No. 636 dua 3:30 p.m., Thursday, April 9, 1981, for the acquisition of (2) 1000 LPM printars for operation in an existing Amdahl V6/II-IBM 370/158 multiprocessing environment.

Request for Proposal No. 637 due 3:30 p.m., Wednesday, April 9, 1981, for the acquisition of a punched card reader with a minimum speed of 1000 cpm and optionally a high-spaed cardpunching unit all for operation in an Amdahl V6/II-IBM 370/158 multiprocessing environmant.

Request for Proposal No. 638 due 3:30 p.m., Wednesday, April 15, 1981, for the acquisition of a system to support data antry, remote job entry and either local online/-interactive processing or CICS capability. This system must facilitate SDLC communications as an SNA rode to an Amdahl V6/II-IBM 370/158 multiprocessing system under ACF/UCP and ACF/VTAM.

Request for Proposal No. 639 due 3:30 p.m., Tuesday, March, 31, 1981, for the acquisition of twelve (12) video display terminals to teach editing and composition to journalism students at a state university.

Detailed specifications may be obtained from the CDPA office. The CDPA reserves the right to reject any and all bids and proposals and to waive informalities.

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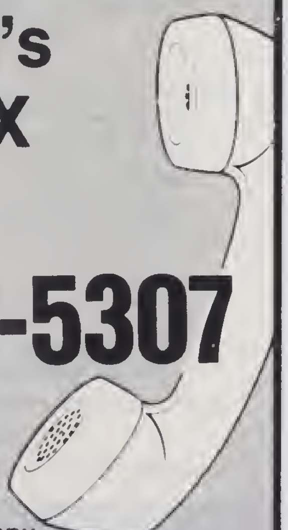

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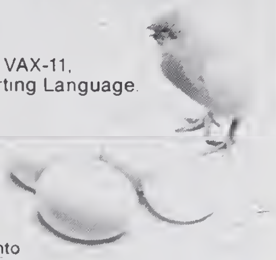

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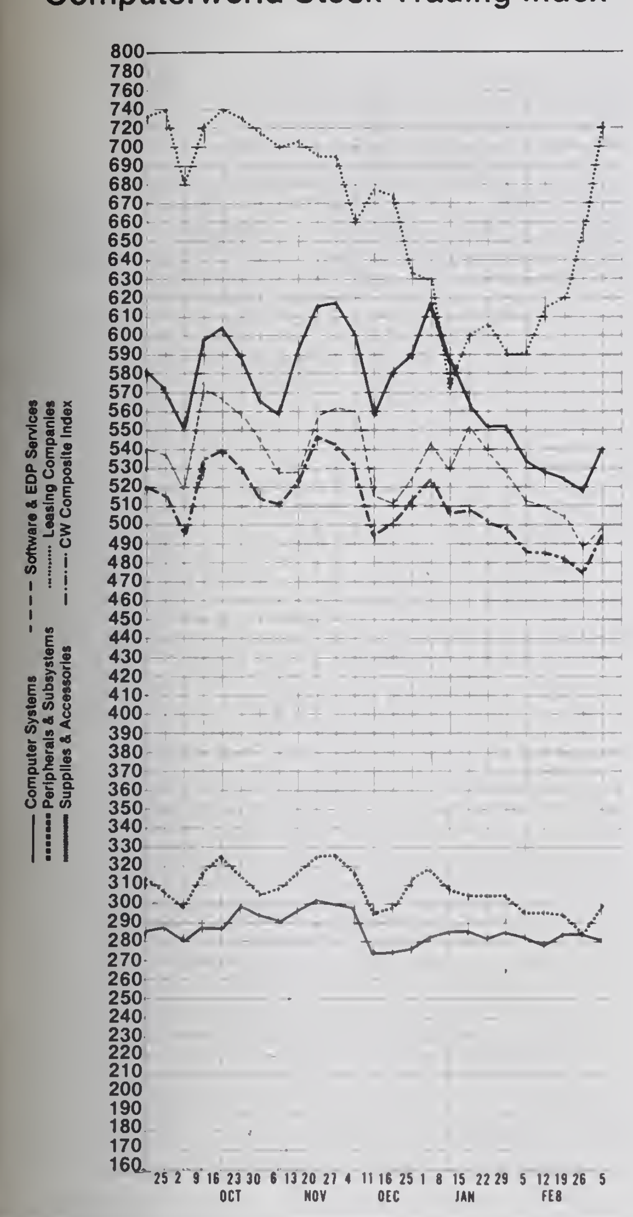

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CLOSING PRICES TUESDAY, MARCH 3, 1981

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A	AMDAHL CORP	15- 42	30 3/8	0	0.0
N	BURROUGHS CORP	47- 88	51 5/8	+1 3/8	+2.7
O	COMPUTER AUTOMATION	9- 27	15 1/4	+ 1/4	+1.6
N	CONTROL DATA CORP	35- 77	65 3/4	+4 3/8	+7.1
O	CRAY RESEARCH INC	10- 49	33 3/4	+ 1/4	+0.7
N	DATA GENERAL CORP	46- 87	52 1/4	+4 7/8	+10.2
N	DATAPOINT CORP	22- 60	50 1/2	+4	+8.6
N	DIGITAL EQUIPMENT	52- 98	86	+ 3/8	+0.4
A	EECO INC	6- 17	13 3/8	0	0.0
N	ELECTRONIC ASSOC.	6- 12	7 1/2	+ 1/2	+7.1
N	FOUR-PHASE SYSTEMS	19- 49	23 5/8	+4 1/2	+23.5
N	FOXBORO	31- 59	47	+1 1/2	+3.2
O	GENERAL AUTOMATION	7- 19	8 5/8	0	0.0
O	GRI COMPUTER CORP	1- 3	1 1/2	0	0.0
N	HARRIS CORP	25- 55	47	+2	+4.4
N	HEWLETT-PACKARD CO	46- 95	85 1/2	- 1/2	-0.5
N	HONEYWELL INC	65-115	102 1/2	+4 5/8	+4.7
N	IBM	50- 79	62 1/2	-1 3/4	-2.7
O	MAGNUSON COMP SYSTS	20- 46	30 1/2	+ 1/4	+0.8
N	MANAGEMENT ASSIST	9- 25	16	+1 3/4	+12.2
O	MINI-COMPUTER SYST	1- 6	1 5/8	0	0.0
O	MODULAR COMPUTER SYS	9- 31	19 3/4	+2 7/8	+17.0
N	NCR	52- 82	63	+5 1/2	+9.5
N	PRIME COMPUTER INC	10- 41	28 3/4	+1 1/4	+4.5
N	PERKIN-ELMER	13- 35	27 1/2	- 3/4	-2.6
N	SPERRY CORP	42- 65	55 1/2	+1 7/8	+3.4
O	TANDEM COMPUTERS INC	13- 76	65 1/2	+4 1/4	+6.9
N	TEXAS INSTRUMENTS	79-150	110 3/8	+ 7/8	+0.7
A	WANG LABS.	17- 60	33 5/8	+1 3/4	+5.4

LEASING COMPANIES

EXCH		PRICE: 1980-81 RANGE (1)	CLOSE MAR 3 1981	WEEK NET CHNGE	WEEK PCT CHNGE
O	BOOTHE FINANCIAL CP	13- 27	21	+2 1/4	+12.0
N	COMDISCO INC	6- 24	21 1/2	+ 1/2	+2.3
A	COMMERCE GROUP CORP	1- 2	1 1/8	0	0.0
A	COMPUTER INVSTRS GRP	0- 4	1/4	0	0.0
O	CONTINENTAL INFO SYS	2- 15	6 1/2	+ 1/2	+8.3
M	DATRONIC RENTAL	3- 5	4 1/2	0	0.0
A	DCI INC	3- 6	2 5/8	0	0.0
N	DPF INC	5- 12	7 7/8	+ 5/8	+8.6
O	ITEL	1- 15	1	+ 1/2	+100.0
O	LEASPAC CORP	1- 2	3/8	0	0.0
A	PIONEER TEX CORP	2- 4	3 3/4	0	0.0
N	RELIANCE GROUP INC	24- 79	71 3/4	+2 1/4	+3.2
N	U.S. LEASING	12- 28	25 7/8	+ 3/8	+1.4

SOFTWARE & EDP SERVICES

EXCH		PRICE: 1980-81 RANGE (1)	CLOSE MAR 3 1981	WEEK NET CHNGE	WEEK PCT CHNGE
O	ADVANCED COMP TECH	1- 6	4 3/8	- 1/8	-2.7
O	ADVANCED SYSTEMS INC	12- 15	13	+ 1/4	+1.9
O	ANACOMP INC	7- 24	17 3/8	- 1/8	-0.7
O	ANALYSTS INTL CORP	3- 14	8 1/2	0	0.0
A	APPLIED DATA RES.	6- 24	17 1/8	+ 7/8	+5.3
N	AUTOMATIC DATA PROC	31- 52	51 1/8	+2 5/8	+5.4
O	CGA COMPUTER ASSOC	9- 17	12 3/4	+ 1/4	+2.0
O	COMPUTER HORIZONS	1- 5	2 1/4	0	0.0
O	COMPUTER NETWORK	4- 9	4 7/8	0	0.0
N	COMPUTER SCIENCES	11- 30	16 3/4	+ 5/8	+3.8
O	COMPUTER TASK GROUP	1- 23	16	- 1/2	-3.0
O	COMPUTER USAGE	2- 10	6 1/4	- 1/8	-1.9
O	COMPUT AUTO REP SVC	4- 11	6 5/8	0	0.0
O	COMSHARE	11- 21	14 3/4	+ 1/4	+1.7
O	CULLINANE DATABASE	18- 41	41 1/4	+7 1/4	+21.3
O	DATA DIMENSIONS INC	1- 6	1 1/8	0	0.0
O	DATATAB	1- 4	1	+ 1/8	+14.2
O	DSI CORP	4- 9	5 1/2	+ 1/4	+4.7
N	ELECTRONIC DATA SYST	19- 44	41 7/8	- 3/4	-1.7
O	INFORMATICS INC	9- 25	24 1/4	+1 5/8	+7.1
O	INSYTE CORP	1- 3	2 3/8	+ 3/8	+18.7
O	IPS COMPUTER MARKET.	1- 4	1	0	0.0
O	KEANE ASSOCIATES	3- 9	5 1/4	+ 1/4	+5.0
O	KEYDATA CORP	1- 5	1	0	0.0
A	LOGICON	12- 34	33 3/4	+4 1/4	+14.4
O	MATHEMATICA INC	5- 18	13 3/4	+ 1/4	+1.8
O	MATHEMATICAL APP GRP	7- 33	15	-1	-6.2
O	NATIONAL DATA CORP	5- 18	15 1/4	- 1/4	-1.6
N	PLANNING RESEARCH	5- 13	6 3/4	- 1/4	-3.5
O	PROGRAMMING & SYS	1- 1	1	0	0.0
O	RAPIDATA INC	4- 11	6	- 1/8	-2.0
O	REYNOLDS & REYNOLD	19- 34	19 3/4	+ 1/4	+1.2
O	STSC INC	6- 28	19	+1	+5.5
O	SCIENTIFIC COMPUTERS	3- 17	10 3/4	- 1/2	-4.4
N	TYMSHARE INC	17- 50	41 1/2	+1 3/4	+4.4
A	URS CORP	5- 17	13 1/8	+ 3/8	+2.9
N	WYLY CORP	4- 20	12 1/4	+ 3/8	+3.1

PERIPHERALS & SUBSYSTEMS

EXCH		PRICE: 1980-81 RANGE (1)	CLOSE MAR 3 1981	WEEK NET CHNGE	WEEK PCT CHNGE
N	AM INTERNATIONAL	11- 24	13 1/2	+ 1/4	+1.8
A	ANDERSON JACOBSON	9- 25	16 3/8	- 1/2	-2.9
O	AUTO-TROL TECHNOLOGY	18- 62	28 1/2	+1 1/4	+4.5
O	BEEHIVE INT'L	2- 18	16	+2 1/4	+16.3
A	BOLT,BERANEK & NEW	12- 37	30 1/4	+1 5/8	+5.6
N	BUNKER RAMO	17- 42	41 5/8	+3 1/2	+9.1
O	CAMBRIDGE MEMORIES	1- 9	2 1/8	+ 1/8	+6.2
N	CENTRONICS DATA COMP	14- 55	14 1/8	-2 1/4	-13.7
A	CETEC CORP	3- 8	7	- 1/8	-1.7
O	COMPUTER DEVICES INC	5- 10	8 7/8	+ 1/4	+2.8
O	COGNITRONICS	1- 10	7 1/4	- 1/4	-3.3
O	COMPUTER COMMUN.	2- 10	2 1/4	+ 1/8	+5.8
O	COMPUTER CONSOLES	4- 29	19 1/2	+ 1/2	+2.6
O	COMPUTER TRANSCEIVER	1- 6	4 3/4	- 1/8	-2.5
N	COMPUTERVISION CORP	24- 92	65 3/4	+1 1/2	+2.3
N	CONRAC CORP	13- 25	19	+ 7/8	+4.8
A	DATA ACCESS SYSTEMS	6- 23	15 5/8	+ 1/4	+1.6
A	DATAPRODUCTS CORP	11- 38	32 3/4	+ 5/8	+1.9
O	DATUM INC	2- 5	3 3/8	+ 1/2	+17.3
O	DECISION DATA COMPUT	2- 6	3 3/4	0	0.0
O	DELTA DATA SYSTEMS	1- 3	2 7/8	+ 5/8	+27.7
O	DATARAM CORP	6- 37	9 5/8	+ 1/4	+2.6
N	ELECTRONIC M & M	3- 9	5 3/8	0	0.0
O	EVANS & SUTHERLAND	21- 83	64	+5	+8.4
O	FABRI-TEK	1- 4	2 7/8	- 1/8	-4.1
O	GENERAL COMPUTER SYS	1- 12	11 1/4	0	0.0
O	GEN'L DATA COMM IND	8- 22	16	+1 1/8	+7.5
O	GENERAL TERMINAL CP	1- 4	1 5/8	0	0.0
N	HAZELTINE CORP	12- 33	23 5/8	+2 3/4	+13.1
O	INFORMATION INTL INC	8- 15	11	+1	+10.0
O	INTEL CORP	23- 50	35 1/4	+1 3/4	+5.2
A	LUNDY ELECTRONICS	4- 17	10 5/8	+ 1/8	+1.1
O	MSI DATA CORP	5- 16	13 3/4	+1	+7.8
N	MEMOREX	10- 34	12 3/8	+ 3/4	+6.4
N	MOHAWK DATA SCI	10- 31	20 3/4	+ 7/8	+4.4
O	NETWORK SYSTEMS CORP	14- 25	17 1/4	+2 1/2	+16.9
O	OMEX	2- 12	10	0	0.0
A	PARADYNE CORP	9- 37	32 1/4	+3 3/8	+11.6
A	PENRIL CORP	9- 16	12 1/8	+ 1/4	+2.1
O	RAMTEK CORP	10- 23	16 1/2	+ 3/4	+4.7
O	RECOGNITION EQUIP	5- 21	13 1/4	+ 3/4	+6.0
O	SCAN DATA	1- 5	1 3/4	0	0.0
N	STORAGE TECHNOLOGY	12- 26	20 5/8	+2 1/2	+13.7
O	SYKES DATATRONICS	14- 50	38 1/2	+5 1/2	+16.6
O	T BAR INC	14- 24	17 1/8	-2 3/8	-12.1
A	TEC INC	3- 9	4 1/8	- 1/4	-5.7
N	TEKTRONIX INC	42- 70	53 7/8	+2 1/8	+4.1
N	TELEX	3- 7	6 1/2	+ 7/8	+15.5
O	TESDATA SYSTEMS CP	8- 26	9 1/8	- 5/8	-6.4
A	TIMEPLEX INC	5- 22	13 5/8	+1 7/8	+15.9
O	WILTEK INC	1- 3	2 3/4	0	0.0

SUPPLIES & ACCESSORIES

EXCH		PRICE: 1980-81 RANGE (1)	CLOSE MAR 3 1981	WEEK NET CHNGE	WEEK PCT CHNGE
A	AMERICAN BUS PRODS	8- 16	15 1/2	+ 1/8	+0.8
O	BALTIMORE BUS FORMS	1- 2	1/2	0	0.0
N	BARRY WRIGHT	8- 22	18 7/8	+ 1/8	+0.6
O	CYBERMATICS INC	1- 2	1	0	0.0
A	DUPLEX PRODUCTS INC	11- 16	13 5/8	- 1/8	-0.9
N	ENNIS BUS. FORMS	13- 21	14 1/2	- 1/8	-0.8
N	3M COMPANY	46- 63	61 7/8	+ 7/8	+1.4
O	MOORE CORP LTD	27- 37	32 1/2	- 7/8	-2.6
N	NASHUA CORP	20- 35	27	+ 5/8	+2.3
O	STANDARD REGISTER	22- 35	33 1/2	+ 1/2	+1.5
A	TAB PRODUCTS CO	9- 30	16 1/2	-1 1/2	-8.3
N	WABASH MAGNETICS	11- 31	30 1/4	0	0.0
N	WALLACE BUS FORMS	12- 26	22 3/4	- 5/8	-2.6

EXCH: N=NEW YORK; A=AMERICAN; P=PHIL-BALT-WASH
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